1983 - CID510071_Gloucester_CID510096_Mathews_CFPF

Application Details

Funding Opportunity:	1447-Virginia Community Flood Preparedness Fund - Project Grants - CY23 Round 4
Funding Opportunity Due Date:	Nov 12, 2023 11:59 PM
Program Area:	Virginia Community Flood Preparedness Fund
Status:	Under Review
Stage:	Final Application
Initial Submit Date:	Nov 12, 2023 12:45 PM
Initially Submitted By:	Jackie Rickards
Last Submit Date:	
Last Submitted By:	

Contact Information

Primary Contact Information

Active User*:	Yes
Type:	External User
Name*:	Ms. (Salutation) Jackie (First Name) Middle Name Rickards (Last Name)
Title:	Senior Planning Project Manager
Email*:	jrickards@mppdc.com
Address*:	PO Box 286 125 Bowden Street Saluda (City) Virginia (State/Province) 23149 (Postal Code/Zip)
Phone*:	(804) 758-2311 Ext. Phone ###-###-####
Fax:	###-###-####
Comments:	

Organization Information

Status*:	Approved
Name*:	Middle Peninsula Planning District Commission
Organization Type*:	Local Government - PDC
Tax ID*:	
Unique Entity Identifier (UEI)*:	

Organization Website: https://www.mppdc.com/

Address*: PO Box 286

Saluda Virginia 23149
City State/Province Postal Code/Zip

Phone*: (804) 758-2311 Ext.
###-###-####

Fax: ###-###-####

Benefactor:

Vendor ID:

Comments:

VCFPF Applicant Information

Project Description

Name of Local Government*: Middle Peninsula Planning District Commission

Your locality's CID number can be found at the following link: Community Status Book Report

NFIP/DCR Community Identification Number (CID)*: 510071

If a state or federally recognized Indian tribe,

Name of Tribe:

Authorized Individual*: Lewis Lawrence
First Name Last Name

Mailing Address*: 125 Bowden Street
Address Line 1

Address Line 2

Saluda Virginia 2311
City State Zip Code

Telephone Number*: 804-758-2311

Cell Phone Number*: 804-758-2311

Email*: llawrence@mppdc.com

Is the contact person different than the authorized individual?

Contact Person*: Yes

Contact: Jackie Rickards
First Name Last Name

125 Bowden Street
Address Line 1

Address Line 2

Saluda Virginia 23149
City State Zip Code

Telephone Number: 804-758-2311

Cell Phone Number: 804-758-2311

Email Address: jrickards@mppdc.com

Enter a description of the project for which you are applying to this funding opportunity

Project Description*:

MPPDC staff will contract with Virginia Institute of Marine Science to design & deploy a network of tide gauges in the Mobjack Bay to allow for parametric insurance to be offered to insure uninsurable assets currently at risk along the waterfront. MPPDC will procure a Flood Insurance consultant to advise them how best to structure new flood insurance policies and how best to restructure existing policies in a manner which lower premium costs & to improve coverage.

Low-income geographic area means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Is the proposal in this application intended to benefit a low-income geographic area as defined above?

Benefit a low-income geographic area*: Yes

Information regarding your census block(s) can be found at census.gov

Census Block(s) Where Project will Occur*: 1000/1036/2014/2002/1010/2028/2021/2015/2005/2032/3024/2036/3029/1015/1002/1013/1047/1053/1011/

Is Project Located in an NFIP Participating Community?*: Yes

Is Project Located in a Special Flood Hazard Area?*: Yes

Flood Zone(s) (if applicable):

Flood Insurance Rate Map Number(s) (if applicable):

Eligibility CFPF - Round 4 - Projects

Eligibility

Is the applicant a local government (including counties, cities, towns, municipal corporations, authorities, districts, commissions, or political subdivisions created by the General Assembly or pursuant to the Constitution or laws of the Commonwealth, or any combination of these)?

Local Government*: Yes

Yes - Eligible for consideration
No - Not eligible for consideration

Does the local government have an approved resilience plan and has provided a copy or link to the plan with this application?

Resilience Plan*: Yes

Yes - Eligible for consideration under all categories
No - Eligible for consideration for studies, capacity building, and planning only

If the applicant is not a town, city, or county, are letters of support from all affected local governments included in this application?

Letters of Support*: Yes

Yes - Eligible for consideration
No - Not eligible for consideration
N/A - Not applicable

Has this or any portion of this project been included in any application or program previously funded by the Department?

Previously Funded*: No

Yes - Not eligible for consideration
No - Eligible for consideration

Has the applicant provided evidence of an ability to provide the required matching funds?

Evidence of Match Funds*: Yes

Yes - Eligible for consideration
No - Not eligible for consideration
N/A - Match not required

Scoring Criteria for Flood Prevention and Protection Projects - Round 4

Scoring

Category Scoring:
Hold CTRL to select multiple options

Project Category*: All other projects

Is the project area socially vulnerable? (based on ADAPT Virginia?s Social Vulnerability Index Score)
Social Vulnerability Scoring:
Very High Social Vulnerability (More than 1.5)
High Social Vulnerability (1.0 to 1.5)
Moderate Social Vulnerability (0.0 to 1.0)
Low Social Vulnerability (-1.0 to 0.0)
Very Low Social Vulnerability (Less than -1.0)

Socially Vulnerable*: High Social Vulnerability (1.0 to 1.5)

Is the proposed project part of an effort to join or remedy the community?s probation or suspension from the NFIP?

NFIP*: No

Is the proposed project in a low-income geographic area as defined below?
"Low-income geographic area" means any locality, or community within a locality, that has a median household income that is not greater than 80 percent of the local median household income, or any area in the Commonwealth designated as a qualified opportunity zone by the U.S. Secretary of the Treasury via his delegation of authority to the Internal Revenue Service. A project of any size within a low-income geographic area will be considered.

Low-Income Geographic Area*: Yes

Projects eligible for funding may also reduce nutrient and sediment pollution to local waters and the Chesapeake Bay and assist the Commonwealth in achieving local and/or Chesapeake Bay TMDLs. Does the proposed project include implementation of one or more best management practices with a nitrogen, phosphorus, or sediment reduction efficiency established by the Virginia Department of Environmental Quality or the Chesapeake Bay Program Partnership in support of the Chesapeake Bay TMDL Phase III Watershed Implementation Plan?

Reduction of Nutrient and Sediment Pollution*: No

Does this project provide ?community scale? benefits?

Community Scale Benefits*: More than one census block

Expected Lifespan of Project

Expected Lifespan of Project*: Over 20 Years

Comments:

Scope of Work - Projects - Round 4

Scope of Work

Upload your Scope of Work
Please refer to Part IV, Section B. of the grant manual for guidance on how to create your scope of work

Scope of Work*: Parametric Gauges_SCOPE OF WORK.pdf

Comments:
Scope of Work for project.

Budget Narrative

Budget Narrative Attachment*: Parametric Gauges_BUDGET NARRATIVE.pdf

Comments:
Budget narrative for this project.

Scope of Work Supporting Information - Projects

Supporting Information - Projects

Provide population data for the local government in which the project is taking place

Population*: 12156.00

Provide information on the flood risk of the project area, including whether the project is in a mapped floodplain, what flood zone it is in, and when it was last mapped. If the property or area around it has been flooded before, share information on the dates of past flood events and the amount of damage sustained

Historic Flooding data and Hydrologic Studies*: Historic flood damage data andor images.pdf

Include studies, data, reports that demonstrate the proposed project minimizes flood vulnerabilities and does not create flooding or increased flooding (adverse impact) to other properties

No Adverse Impact*: No adverse impact.pdf

Include supporting documents demonstrating the local government's ability to provide its share of the project costs. This must include an estimate of the total project cost, a description of the source of the funds being used, evidence of the local government's ability to pay for the project in full or quarterly prior to reimbursement, and a signed pledge agreement from each contributing organization

Ability to Provide Share of Cost*: Ability to Provide Share of Cost.pdf

A benefit-cost analysis must be submitted with the project application

Benefit-Cost Analysis*: BenefitCost Analysis.pdf

Provide a list of repetitive loss and/or severe repetitive loss properties. Do not provide the addresses for the properties, but include an exact number of repetitive loss and/or severe repetitive loss structures within the project area

Repetitive Loss and/or Severe Repetitive Loss Properties*: RL_SRL Properties.pdf

Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area

Residential and/or Commercial Structures*:

Within Gloucester County residential land comprises the largest developed land use within the County, with the highest residential concentrations located in the Court House and Gloucester Point/Hayes areas. As public water and sewer are available throughout much of the Route 17 corridor between Gloucester Point and the Court House, areas inside the Development District are identified for higher density commercial and residential development. Gloucester Point/Hayes and the Court House are identified as Village Development Areas (VDA?s), areas designated for higher density development due to proximity to transportation facilities, public water and sewer availability, and/ or a developed area to be used for redevelopment or infill development. Outside of the VDA?s, residential development has primarily occurred along major roadways with scattered residential lots and subdivisions dispersed throughout other rural areas.

Within Mathews County According to the 2010 Census, most of the residential structures in the County were single-family homes (85%). Apartments or duplex structures represented less than 3% of the housing stock, while mobile homes represented approximately 12.5% of the housing stock.

It?s important to mention that the majority of structures located within the project area are residential. Since many of these structures are waterfront, they contribute substantially to the tax base of each County. Additionally, based on outcomes from the 2021 Regional All Hazards Mitigation Plan Gloucester County and Mathews County has the highest potential annualized loss due to sea level rise and hurricanes. Therefore, as this project area highly vulnerable to inundation these residents need assistance.

If there are critical facilities/infrastructure within the project area, describe each facility

Critical Facilities/Infrastructure*:

According to the Middle Peninsula Regional All Hazards Mitigation Plan, there are critical Facilities/infrastructure within Gloucester and Mathews County. Below provides details about each county.

GLOUCESTER COUNTY - The county has a relatively extensive network of public water and sewer facilities in and around the Gloucester Courthouse area. The Beaverdam Reservoir, located just north of the courthouse area, serves as the drinking water source for the county?s public water supply system. As discussed earlier in the Dam Impoundment Section of the plan, the dam is structurally well-built and remains fully certified by the DCR. Below the dam there are approximately 200 homes that would flood if the Reservoir structure failed. However, in 1999 the impoundment overflowed during Hurricane Floyd yet no flood damage to the home since the excess water flowed downstream using the emergency spillway.

The water distribution system does not suffer damage during severe storm events since it is a closed underground system. The sewerage collection lines and pumps stations are owned and operated by Gloucester County. There are 2 pump stations in the Gloucester Courthouse area (Pump # 11 and Pump #13) that sustained damage during Hurricane Floyd in 1999. The damage was caused by floodwaters resulting from the overtopping of the Beaverdam Reservoir as previously mentioned. After the wastewater is collected, it is transported in a large force main that runs down Route 17, crosses under the York River and then flows into the York River Wastewater Treatment Plant in York County. The large force main and treatment plant are owned and operated by the Hampton Roads Sanitation District. The force main is a closed underground system that does not sustain damage during severe flooding events.

The Achilles Elementary School site, located in the southeastern section of the county, is adversely affected by flood waters from storms surges associated with a Category 1 hurricane.

MATHEWS COUNTY - New Point Comfort Lighthouse, located at the southern tip of Mathews County, has undergone significant flood damage resulting from the lighthouse being separated from the mainland due to severe erosion.

Mathews County owns the lighthouse facility. In 2016 the Waterfront Development Corporation installed a new pier at the lighthouse that allowed contractors to access the site for restoring the stone tower.

See a map of essential facilities in the uploaded documents.

Explain the local government's financial and staff resources. How many relevant staff members does the local government have? To what relevant software does the local government have access? What are the local government's capabilities?

Financial and Staff Resources*:

MPPDC staff assists localities with long-term and/or regional planning efforts. The MPPDC Executive Director, Deputy Director, Senior Planning Project Manager, and Chief Financial Officer have decades of experience in managing and administering project grants at multiple scales - from grants in excess of $1,000,000 to small grants. MPPDC is an entrepreneurial-based government agency with an annual operating budget over $8 million.

Annually, the MPPDC manages 25-50 concurrent federal and state grants utilizing industry standard Grants Management Software and other software (e.g., GIS, Microsoft Office) as required and/or necessitated by different grants. MPPDC has more than 25 years of experience managing multiple revolving loan programs. In the 25 years that the Executive Director has been employed by the Commission, no audit findings have occurred.

Identify and describe the goals and objectives of the project. Include a description of the expected results of the completed project and explain the expected benefits of the project. This may include financial benefits, increased awareness, decreased risk, etc.

Goals and Objectives*:

Goal 1: Structure and pilot the provision of parametric insurance coverage for residents of Mobjack Bay.
- Objective 1: Provide parametric insurance company with networked monitoring data (historic and new)
Target: One completed plan for gauge deployment.
- Objective 2: Launch new gauge network.
Target: Update existing monitoring equipment, including 3 CBNERR-VA stations.
Target: Deploy six new sensors in the Mobjack Bay & its associated tributaries.
- Objective 3: Establish parametric insurance coverage marketable to a new Mobjack Bay parametric insurance service area.
Target: Activation of parametric insurance policies in the Mobjack Bay service area
Target: Development of informational & educational materials and launch of campaign promoting new parametric insurance availability.
- Objective 4: Launch Low-Income Parametric Insurance Accelerator
Target: One campaign to solicit applications for free year of parametric insurance policies.
Target: Successfully develop, launch, & promote parametric policies for citizens. Number of new policies to be determined based on premium levels with funds being allocated on a first come first served basis.
- Objective 5: Conduct analyses of parametric policy premiums & identify strategies for premium reductions.
Target: Survey each participant in the Low-Income Parametric Insurance Accelerator to understand premium costs, affordability, likelihood of renewal/sustainability of coverage, etc.
Target: Develop summary of findings to inform future parametric service area networks & modifications/improvements to the pilot service area as needed.
- Objective 6: Ensure transferability to other communities.
Target: One assessment of the success of pilot program toward the provision of services to communities beyond proposal?s target geography.

Goal 2: Enhance and advance flood insurance policies & premium affordability, sea level monitoring, & flood forecasting in the Middle Peninsula.
- Objective 1: Develop, share & promote flood insurance educational materials
- Objective 2: Procure Flood Insurance Consultant to engage all registered FTF participants & advise as to how to structure new & restructure existing flood insurance policies. Solicit additional FTF participation & provide same services accordingly.
- Objective 3: Integrate new sensor data into the Tidewatch Network.
- Objective 4: Maintain & manage monitoring data through Tidewatch Network for continued insurance application, as well as planning.

Outline a plan of action laying out the scope and detail of how the proposed work will be accomplished with a timeline identifying expected completion dates. Determine milestones for the project that will be used to track progress. Explain what deliverables can be expected at each milestone, and what the final project deliverables will be. Identify other project partners

Approach, Milestones, and Deliverables*: Approach Milestones and Deliverables.pdf

Where applicable, briefly describe the relationship between this project and other past, current, or future resilience projects. If the applicant has received or applied for any other grants or loans, please identify those projects, and, if applicable, describe any problems that arose with meeting the obligations of the grant and how the obligations of this project will be met

Relationship to Other Projects*:

This project relates to Middle Peninsula regional resilience efforts. For more than 40 years, the Middle Peninsula Planning District Commission (MPPDC) and its participating localities have worked diligently on topics associated with the land water interface, including coastal use conflicts and policies, sea level rise, stormwater flooding, roadside ditch flooding, erosion, living shorelines, coastal storm hazards (e.g., hurricanes, tropical storms), riverine and coastal flooding, and coastal resiliency.

The proposed project is a priority project generated from the Middle Peninsula Regional Flood Resilience Plan, which was approved by DCR in August of 2021. This Flood Resiliency Plan serves as the MPPDC?s guiding document for its flood resiliency programs and is comprised of two primary MPPDC-approved policy documents. These documents frame the foundation and implementation of the Middle Peninsula flood protection approach and are indirectly and directly supported by specific regional planning documents each approved by federal, regional, and/or local partners as required by statute.

Other plans and resources integral to the implementation of the Flood Resiliency Plan include:
Long Term Planning
- Middle Peninsula All Hazard Mitigation Plan - FEMA and Middle Peninsula locality, approved 2021 (MPPDC Website)
o This overarching project provides updates every five years on the hazards within the region; it identifies the top hazards within the region and provides a HAZUS assessment that analyzes flooding (riverine and coastal), sea-level rise and hurricane storm surge impacts in the region. Additionally, this plan lists strategies and objectives that guide member localities to mitigate these strategies.
- Middle Peninsula Comprehensive Economic Development Strategy ? MPPDC, approved June 2022
- Middle Peninsula VDOT Rural Long Range Transportation Plan ? MPPDC, approved annually

Short Term Implementation
- Middle Peninsula Planning District Commission Fight the Flood Program Design - MPPDC Commission, approved June 2020; Chairman approved update 8/6/21
- Middle Peninsula Planning District Commission Living Shoreline Resiliency Incentive Funding Program - Virginia Revolving Loan Fund Program Design and Guidelines, approved 2015

The MPPDC has a history of continuous work on flooding and coastal resiliency topics, as described in the uploaded document titled, "Relationship to other projects."

For ongoing projects or projects that will require future maintenance, such as infrastructure, flood warning and response systems, signs, websites, or flood risk applications, a maintenance, management, and monitoring plan for the projects must be provided

Maintenance Plan*: MAINTENANCE PLAN.pdf

Describe how the project meets each of the applicable scoring criteria contained in Appendix B. Documentation can be incorporated into the Scope of Work Narrative

Criteria*:

Scoring Criteria:
- Under Eligible Projects, this proposal scores 10 of the 30 points for all other projects
- Under Social Vulnerability Index Score, this proposal scores 8 out of 10 points for serving an area with a High Social Vulnerability index.
- Under Community Scale of Benefits, this proposal scores 30 out of 30 points for serving more than one census block.
- Under Expected Lifespan of Project, this proposal scores 10 out of 10 points for providing a lifespan of Over 20 Years.
- Under Remedy for NFIP probation or suspension, the proposal scores 0 out of 5 points.
- Under Low-income geographic area, the proposal scores 10 out of 10 points.
- Under implementing a Chesapeake Bay TMDL BMP, the proposal scores 0 out of 5 points.
The total score for this proposal is 68 out of 100 points.

Budget

Budget Summary

Grant Matching Requirement*: LOW INCOME - All other Projects Fund 85%/Match 15%

I certify that my project is in a low-income geographic area:	Yes
Total Project Amount*:	$1,150,000.00
REQUIRED Match Percentage Amount:	$172,500.00

BUDGET TOTALS

Before submitting your application be sure that you meet the match requirements for your project type.

Match Percentage:	15.00% Verify that your match percentage matches your required match percentage amount above.
Total Requested Fund Amount:	$1,000,000.00
Total Match Amount:	$176,471.00
TOTAL:	$1,176,471.00

Personnel

Description	Requested Fund Amount	Match Amount	Match Source
FTF Program Administrator - New Hire	$145,000.00	$0.00	
	$145,000.00	**$0.00**	

Fringe Benefits

Description	Requested Fund Amount	Match Amount	Match Source
FTF Program Administrator	$38,382.00	$0.00	
	$38,382.00	**$0.00**	

Travel

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Equipment

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Supplies

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Construction

Description	Requested Fund Amount	Match Amount	Match Source
No Data for Table			

Contracts

Description	Requested Fund Amount	Match Amount	Match Source
Virginia Institute of Marine Resources & Consociate Media	$762,247.00	$0.00	
	$762,247.00	**$0.00**	

Maintenance Costs

Description	Requested Fund Amount	Match Amount	Match Source

No Data for Table

Pre-Award and Startup Costs

Description	Requested Fund Amount	Match Amount	Match Source

No Data for Table

Other Direct Costs

Description	Requested Fund Amount	Match Amount	Match Source
Indirect costs for New Hire - FTF Program Administrator	$54,371.00	$0.00	
MPPDC Match	$0.00	$176,471.00	value in MPPDC living shoreline loan funds as leveraged match against this total request
	$54,371.00	**$176,471.00**	

Long and Short Term Loan Budget - Projects - VCFPF

Budget Summary

Are you applying for a short term, long term, or no loan as part of your application?

If you are not applying for a loan, select "not applying for loan" and leave all other fields on this screen blank

Long or Short Term*: Not Applying for Loan

Total Project Amount: $0.00

Total Requested Fund Amount: $0.00

TOTAL: $0.00

Salaries

Description	Requested Fund Amount

No Data for Table

Fringe Benefits

Description	Requested Fund Amount

No Data for Table

Travel

Description	Requested Fund Amount
No Data for Table	

Equipment

Description	Requested Fund Amount
No Data for Table	

Supplies

Description	Requested Fund Amount
No Data for Table	

Construction

Description	Requested Fund Amount
No Data for Table	

Contracts

Description	Requested Fund Amount
No Data for Table	

Other Direct Costs

Description	Requested Fund Amount
No Data for Table	

Supporting Documentation

Supporting Documentation

Named Attachment	Required	Description	File Name	Type	Size	Upload Date
Detailed map of the project area(s) (Projects/Studies)		Map of project location	Detailed Map of Project Area.pdf	pdf	156 KB	11/11/2023 09:58 PM
FIRMette of the project area(s) (Projects/Studies)		FIRMettes of project area.	FIRMette -eastern MB.pdf	pdf	14 MB	11/11/2023 09:58 PM
Historic flood damage data and/or images (Projects/Studies)		Historic flood damage at project location.	Historic flood damage data andor images.pdf	pdf	146 KB	11/11/2023 09:58 PM
A link to or a copy of the current floodplain ordinance		Gloucester and Mathews County Floodplain Ordinances.	Floodplain Ordinances.pdf	pdf	79 KB	11/11/2023 10:11 PM
Maintenance and management plan for project		Maintenance plan for project.	MAINTENANCE PLAN.pdf	pdf	92 KB	11/11/2023 10:01 PM
A link to or a copy of the current hazard mitigation plan		Middle Peninsula All Hazards Mitigation Plan approved by FEMA on 4/12/21.	FINAL_2021_Amended MPPDC Plan_093122_RED 32.pdf	pdf	27 MB	11/10/2023 10:49 AM
A link to or a copy of the current comprehensive plan		Links to Mathews County and Gloucester County Comprehensive Plans.	Glo_Mathews_Comprehensive Plans.pdf	pdf	92 KB	11/10/2023 10:52 AM
Social vulnerability index score(s) for the project area		Social vulnerability index score for the project area.	Social vulnerability index.pdf	pdf	128 KB	11/11/2023 10:01 PM
Authorization to request funding from the Fund from governing body or chief executive of the local government		Authorization from MPPDC Executive Director Lewis Lawrence	Authorization to Request.pdf	pdf	210 KB	11/10/2023 10:53 AM
Signed pledge agreement from each contributing organization		Match pledge	Committment.pdf	pdf	191 KB	11/11/2023 10:07 PM
Maintenance Plan		Maintenance plan for project.	MAINTENANCE PLAN.pdf	pdf	92 KB	11/11/2023 10:00 PM
Benefit-cost analysis must be submitted with project applications over $2,000,000. in lieu of using the FEMA benefit-cost analysis tool, applicants may submit a narrative to describe in detail the cost benefits and value. The narrative must explicitly indicate the risk reduction benefits of a flood mitigation project and compares those benefits to its cost-effectiveness.						
Benefit Cost Analysis		Benefit cost analysis of project.	BenefitCost Analysis.pdf	pdf	66 KB	11/11/2023 09:59 PM
Other Relevant Attachments		Relationship to other MPPDC projects	Relationship to Other Projects.pdf	pdf	210 KB	11/11/2023 10:12 PM

Letters of Support

Description	File Name	Type	Size	Upload Date
Gloucester County Support Letter	231108 DCR regional support letter from Gloucester.pdf	pdf	39 KB	11/11/2023 10:13 PM
Mathews County Support Letter	MATHEW1.PDF	PDF	281 KB	11/11/2023 10:12 PM

Resilience Plan

Resilience Plan

Description	File Name	Type	Size	Upload Date
Middle Peninsula Resilience Plan	Resilience Plan_Approved-8_19_DCR-packet_letterandplan.pdf	pdf	850 KB	11/10/2023 10:45 AM

Matthew J. Strickler
Secretary of Natural and Historic Resources and Chief Resilience Officer

Clyde E. Cristman
Director

COMMONWEALTH of VIRGINIA
DEPARTMENT OF CONSERVATION AND RECREATION

Rochelle Altholz
Deputy Director of Administration and Finance

Nathan Burrell
Deputy Director of Government and Community Relations

Darryl M. Glover
Deputy Director of Dam Safety & Floodplain Management and Soil & Water Conservation

Thomas L. Smith
Deputy Director of Operations

August 19, 2021

Mr. Lewis L. Lawrence, Executive Director
Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
PO Box 286
Saluda, Virginia 23149

Re: MPPDC Resilience Plan Second Submission - CFPF

Dear Mr. Lawrence:

Thank you for the resubmission of the Middle Peninsula Planning District Commission's (MPPDC) Regional Flood Resiliency Plan. After careful review and consideration, the Virginia Department of Conservation and Recreation has deemed the Plan meets the criteria outlined in the June 2021 Community Flood Preparedness Grant Manual. This approval will remain in effect for a period of three years, ending on August 20, 2024.

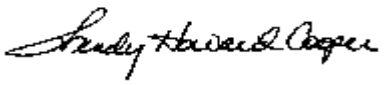
1. **Element 1: It is project-based with projects focused on flood control and resilience. VA-DCR RESPONSE:**
    a. Meets criteria as written.
2. **Element 2: It incorporates nature-based infrastructure to the maximum extent possible. VA-DCR RESPONSE**:
    a. Meets criteria as written.
3. **Element 3: It includes considerations of all parts of the local government regardless of socioeconomics or race. VA-DCR RESPONSE:**
    a. Meets criteria as written.
        i. The provided plan meets the requirements of Element 3 in Appendix G of the Grant Manual. However, flood data referenced in the MPPDC portrays the majority of flooding as coastal. As we discussed during our meeting with you on August 4, 2021, there are additional types of flooding in MPPDC localities. DCR recommends the commission develop a more comprehensive planning document(s) addressing the MPPDC's overarching approach to furthering flood resilience beyond shoreline protection in all nine member localities.

4. **Element 4: It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation. VA-DCR RESPONSE:**
    a. Meets criteria as written.
        i. DCR recognizes that both program designs make participation available to residents of all MPPDC member localities who have the ability to qualify, and that the individual program designs offer detailed breakdowns of the timeline and terms for loans disbursed pursuant to individual projects once accepted. This does not constitute a project-based timeline or phasing plan for addressing flooding resilience at the regional, locality, or community level. DCR recommends additional consideration be given to how all flooding, regardless of ability to pay, will be addressed in the MPPDC.

5. **Element 5: Is based on the best available science, and incorporates climate change, sea level rise, storm surge (where appropriate), and current flood maps. VA-DCR RESPONSE:**
    a. Meets criteria as written.

VA DCR looks forward to working with the MPPDC in its efforts to develop a resilience plan that addresses flooding for its nine member communities.

Sincerely,



Wendy Howard Cooper, Director
Dam Safety and Floodplain Management

cc: Darryl M. Glover, DCR

Middle Peninsula Regional Flood Resiliency Plan

Resubmittal #3 8/6/21

Approved DCR 8/19/21 until 8/20/24

The Middle Peninsula is located on the western shore of the Chesapeake Bay, bound to the north by the Rappahannock River and to the south by the York River. As the region is in the Virginia coastal plain, it has a relatively flat topography with approximately 4,000 National Flood Insurance policies, approximately 415 repetitive loss and 30 severe repetitive loss structures, all of which are located along or near 1,000 miles of privately-owned shorelines generating necessary tax revenue to fund essential local governmental services. The southeastern portions of the region are located at or close to sea level, while elevation rises to approximately 200 feet above sea level moving in a northwesterly direction. Flooding is the most frequent and costly natural hazard in the United States as well as the Middle Peninsula. Since 1978 more than $60,000,000 in Federal Flood Insurance losses have been paid due to all forms of flooding in the region.

Flooding impacts all socioeconomic groups (regardless of race, gender, age, ethnicity, diversity, or income). All land uses are subject to the destructive forces of water including, but not limited to residential, commercial, industrial, retail, agricultural, silvicultural, recreational, and publicly owned assets. All of the Middle Peninsula is subject to all types of flooding including but not limited to coastal, riverine, storm surge, inland, stormwater, flash flooding, groundwater, areal, ponding (pluvial), or urban.

The Middle Peninsula Planning District Commission (MPPDC) recognizes the need to better secure the tax base of coastal localities against the risk of flooding and the expectation to deliver essential governmental services, including public safety. All of which are more frequently challenged by coastal storms and recurrent flooding of all types. There is an unfortunate and eroding relationship between at-risk real estate values and funding of essential governmental services. Without proactive flood mitigation for coastal lands and structures, the rural coastal tax base will literally and figuratively erode into the Chesapeake Bay. Revenue will continue to decline with flood insurance claims, agricultural claims and uninsured costs will continuing to increase.

In response to emerging flood challenges, the MPPDC Commission has authorized staff to develop the **Middle Peninsula Fight the Flood (FTF) Program** which leverages state and federal funding to deliver flood mitigation solutions directly to constituents, for both the built environment and the natural environment with an emphasis on nature-based flood mitigation solutions. The Middle Peninsula **Living Shoreline Resiliency Incentive Funding Program** has been the only structured program in the Commonwealth offering loan and grants to all qualified waterfront citizens and waterfront businesses since its establishment in 2015.

The Middle Peninsula **FTF** program helps property owners gain access to programs and services to better manage challenges posed by flood water.

The Middle Peninsula's Regional Flood Resiliency Plan is comprised of two primary approved policy documents which form the implementation and foundation of the Middle Peninsula flood protection approach and are indirectly and directly supported by multiple specific regional planning documents, both approved by various required federal, regional or local partners as required by statute. These documents contain the elements described in the DCR Virginia Community Flood Preparedness Fund to qualify as the region's Resiliency Plan.

Long Term Planning

- **Middle Peninsula All Hazard Mitigation Plan, FEMA and Middle Peninsula locality approved 2016 (MPPDC Website)**

- **Middle Peninsula Comprehensive Economic Development Strategy, MPPDC Approved March 2021 (MPPDC Website)**

- **Middle Peninsula VDOT Rural Long Range Transportation Plan - MPPDC Approved ~annually**

Short Term Implementation

- **Middle Peninsula Planning District Commission Fight the Flood Program Design MPPDC Commission approved June 2020 (Attached) Chairman approved 8/6/21 update**
- **Middle Peninsula Planning District Commission Living Shoreline Resiliency Incentive Funding Program-Virginia Revolving Loan Fund Program Design and Guidelines approved 2015 (Attached)**

These five documents contain the required elements described in the 2021 Grant manual for the Virginia Community Flood Preparedness Fund.

For applications made under the Virginia Community Flood Preparedness Fund and if grants and loans are made available, it is the policy of the MPPDC to provide such to qualified participants based on the terms and conditions associated with flood risk, as well as providing various grant and loan funds available to support the public purpose(s) for which the funds have been allocated. The program utilizes income guidelines for residential participation based on household income and ability to pay. Businesses will provide documentation such as profit and loss statement and/or other documentation of adequate business equity to collateralize the public investment). Grant/Loan awards, if available will be based on the program requirements of the source of the funds, if any. Unless otherwise dictated by the source of the grant funds, MPPDC will distribute grant funds on a sliding scale according to FEMA Flood insurance zones for any qualified resiliency project that meets the definition of a living shoreline found in § 28.2-104.1 of

the Code of Virginia and is designed to attenuate the impinging wave climate across the sill and marsh system during significant storm events. FEMA flood zone determination is based on the best available science recognized by FEMA. Unless prohibited by the funding source or type of project, at a minimum, project designs shall be designed to and based on site conditions identified within the locality FEMA Flood Insurance Study (FIS) which use statistical water levels, wave heights and fetch exposure.

> **FEMA FIS:** A compilation and presentation of flood risk data for specific watercourses, lakes, and coastal flood hazard areas within a community. When a flood study is completed for the NFIP, the information and maps are assembled into an FIS. The FIS report contains detailed flood elevation data in flood profiles and data tables.

Projects funded must have a primary purpose of prevention or protection to reduce coastal, riverine or inland flooding and focus on:

> **Nature-based solutions:** including but not limited to: wetland restoration, floodplain restoration, swales and settling ponds, living shorelines and vegetated buffers.
>
> **Additional flood control solutions:** including, but not limited to: floodwalls, levees, berms, flood gates, structural conveyances and storm water systems.
>
> **Preservation and creation of open space:** including property acquisition and relocation and the permanent conservation of lands identified as having flood resilience value by the Conserve Virginia Floodplain and Flooding Resilience layer or a similar data driven analytic tool.

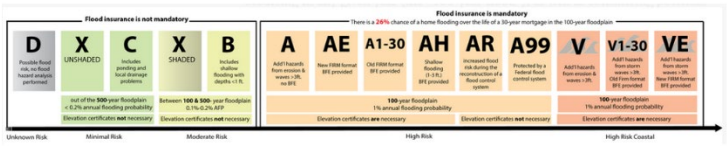
Designs will be recognized and considered that are sourced to other qualified metrics which include:

- Appropriate company certification illustrating and documentation of
    - nature based solution and
    - flood control solutions including documentation of BMP approval for erosion control, water quality or flood protection.
- Designed and certified by a licensed professional who routinely designs projects for the flood mitigation space.

Designs shall take into consideration any additional requirements, such as required sea-level rise rates.

Unless prohibited or directed by the funding program, MPPDC has established grant funding thresholds based on flood risk established by FEMA.

Living Shoreline Resiliency Grant Limits



0% Up to 10% Grant 11% up to 50% Grant 51% up to 80% Grant

The DCR guidelines require that an approved plan shall meet the following criteria:

- It is project-based with projects focused on flood control and resilience. MPPDC YES
- It incorporates nature-based infrastructure in specific projects. MPPDC YES
- It includes considerations of all parts of a locality regardless of socioeconomics or race. MPPDC YES
- It includes coordination with other local and inter-jurisdictional projects, plans, and activities and has a clearly articulated timeline or phasing for plan implementation. MPPDC YES
- Is based on the best available science, and incorporates climate change, sea-level rise, and storm-surge (where appropriate), and current flood map MPPDC YES

The following MPPDC program designs for the Middle Peninsula Planning District Commission **Fight the Flood Program** and the **Living Shoreline Resiliency Incentive Funding Program** are the implementation structure for administering the expenditure of funding provided by the Virginia Community Flood Preparedness Fund

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Middle Peninsula Planning District Commission
Fight the Flood Program
Program Design
MPPDC Commission Approved
6/24/20
Amended Per PDC Chairman 8/6/21
OVERVIEW

The Program Design for the Middle Peninsula Fight the Flood Program (FTF) outlines marketing strategies, loan application, review process, funds management, administration, and loan agreements with property and business owners. This document can be administratively reviewed with minor programmatic amendments subject to MPPDC Chairman approval. Significant programmatic changes require Commission approval.

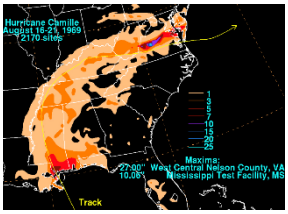
Fight the Flood: Public Purpose Statement

The MPPDC Fight the Flood (FTF) program recognizes the need to better secure the tax base of coastal localities; the inherent risk to the delivery of essential governmental services, including public safety, posed by coastal storms and recurrent flooding of all types; and the relationship between at-risk waterfront real estate values and funding of

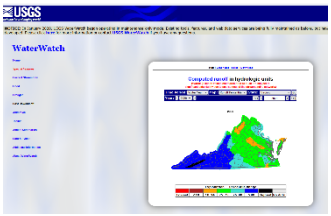
essential governmental services. The FTF program exists to help flood-prone property owners access programs and services to better manage challenges posed by flood water. When grants and loans are available, it is the policy of the MPPDC to provide such to qualified participants based on the terms and conditions associated with flood risk, as well as providing various grant and loan funds available to support the public purpose(s) for which the funds have been allocated.

The Fight the Flood program goals are to generate and facilitate community resiliency by addressing all types of flooding which impact all socioeconomic groups (regardless of race, gender, age, ethnicity, diversity, or income). All land uses are subject to the destructive forces of water including, but not limited to residential, commercial, industrial, retail, agricultural, silvicultural, recreational, and publicly owned assets. All of the Middle Peninsula is subject to all types of flooding including but not limited to coastal, riverine, storm surge, inland, stormwater, flash flooding, groundwater, areal, ponding (pluvial), or urban.

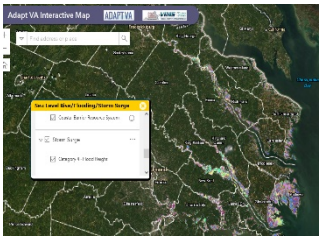
Water impacts the Middle Peninsula from a variety of sources and conditions including velocity, duration, frequency, and volume.



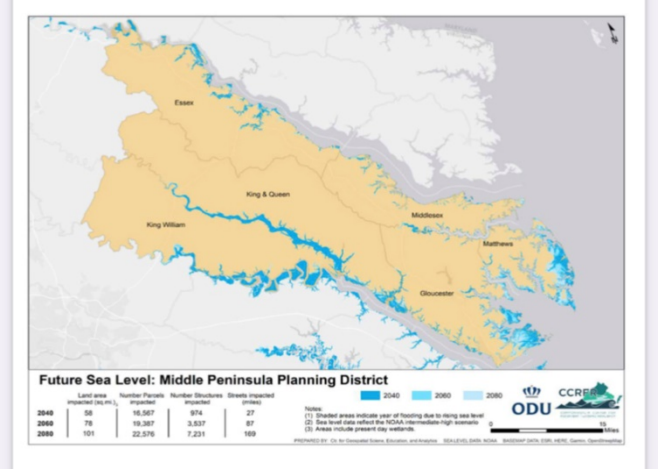
Fast Moving: Hurricane Camille was a fast-moving storm with massive rainfall over a quick time period. This type of event has major and widespread flooding impacts across the entire Middle Peninsula.



Slow Moving: According to the USGS, all of the Middle Peninsula experiences stormwater runoff between the 10-75% range causing water to move over the landscape with the ability to cause erosion.



Storm Surge: Land uses along the riverfront, Chesapeake Bay front and streams subject to tidal influence will experience surge that encompasses all land area, including the built and natural environment for the duration of the surge.



Sea-LevelRise: Land uses along the riverfront, Chesapeake Bay front and streams are subject to increasing sunny day flooding events and more frequent flooding due to sea-level rise and subsidence. By 2040, the estimates 16,567 Middle Peninsula parcels with be impacted by sea level rise [Commonwealth Center for Recurrent Flooding Resiliency]

The Fight the Flood program looks to help mitigate flooding issues which impact all socioeconomic groups while also enhancing water quality, and to encourage economic growth by targeting and attracting businesses to provide flood mitigation products and services for flood-prone properties, including shorelines and buildings. When appropriate, projects should be designed not only for today's flooding challenges, but also designed for future flooding challenges by extrapolating FEMA flood risk using FEMA Insurance Studies or other appropriate methodologies.

To accomplish its stated goal, the Fight the Flood program identified three core **Objectives** that develop the program's policy framework:

Objectives

1. Provide financial products to influence consumer behavior for managing and mitigating flood risk
    a. Offer a suite of financial products (i.e. loans, grants, insurance) with a correlation to lower interest rates and grants for shorelines under greater risk; higher rates and less grant funding for lower risk shorelines using FEMA flood zones
    b. **When possible, leverage General Assembly legislation such as § 58.1-3228.1.** *Partial exemption from real property taxes for flood mitigation efforts for grant matching funds.*
2. Provide consumer to professional services connections through the Fight the Flood program
    a. Registered consumers with a flood mitigation issue will have direct access to a pool of established resiliency professionals.
    b. Participating companies are evaluated on a regular basis
    c. Resiliency professional registered under Fight the Flood may provide discounted professional services to consumers in need.

3. Utilize reach-based Shoreline Implementation "Battle Plans" to facilitate multi parcel mitigation projects for economy of scale. These plans will be prepared and or reviewed by qualified professionals in the field of coastal flooding, such as Virginia Institute of Marine Science Shoreline Studies Program or plans funded under the Virginia Coastal Zone Management Program

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I. Marketing Strategy

A. Geographic Area of Program: The Program shall be available to homeowners located in the Middle Peninsula Planning District Commission ("MMPDC"). The MPPDC comprises of the following member-localities: counties of Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex; and the towns of Tappahannock, Urbanna, and West Point.

B. Solicitation of Fight the Flood/Marketing:

1. Referrals from private sector contractors, design professionals, flood mitigations companies and engineers
2. Referrals from local governments, including local wetland boards and/or other State agencies
3. Social Media Channels, Websites, News releases, Public Information Notices, i.e. newspapers, fliers at public locations, educational displays

C. Outcomes from FTF Participation:

1. Encourage homeowners to purchase flood insurance;
2. Encourage homeowners with existing flood insurance to evaluate cost effectiveness for premium relief;
3. Encourage homeowners to practice coastal resilience to manage flood risk and reduce damage

D. Available FTF financial & insurance products:
Current existing products are included in the FTF program

1. MPPDC Revolving Loan Program Funding
   - Living Shorelines Resiliency Incentive Funding Program
     - **a.** Nature-based shoreline BMP construction
     - **b.** Coastal stormwater BMP construction
   - Septic Repair Program
   - Energy Efficiency Revolving Loan Program
   - Small Business Financing, Training, loan and grants
   - Other loans programs as available
2. MPPDC Grants

- Grants shall be leveraged and utilized to provide protection for hazard and flood prone areas with an enhanced focus on socioeconomically vulnerable property owners.
    - **a.** Nature-based shoreline BMP construction
    - **b.** Coastal stormwater BMP construction
    - **c.** Residential infrastructure resiliency improvements (i.e. structures, septic systems, utilities, etc.)
- Loan Forgiveness options when available
- VCAP Grants (offered by the Soil Water and Conservation District) when available
- Other grants and grant programs as available

3. MPPDC Insurance

- Parametric insurance for living shorelines and septic systems
- MPPDC Living Shoreline Plant Insurance Program
- Other insurance products as available

E. Income Guideline: Residential participation will be based on the household income and ability to pay. Businesses shall provide documentation such as profit-and-loss statements and/or other documentation of adequate business equity to collateralize the public investment. Grant/loan awards, if available will be based on the program requirements of the source of the funds, if any.

F. Terms of Loan:
Homeowners who are eligible to receive a revolving loan from the existing MPPDC Living Shoreline Loan program (see MPPDC program design for specific requirement) shall be subject to the following terms:

1. All loans over $3,000 shall be secured with a Deed of Trust granted to the Middle Peninsula Planning District Commissioner. Businesses may use a deed of trust, security agreement, UCC liens, etc.

2. The owner of the property must agree that, if the property is sold, transferred, or otherwise conveyed voluntarily, when the owner is living, or if the real estate ceases for any reason to be the owner's principal place of residence, any outstanding balance must be paid back to the Middle Peninsula Planning District Commission.

3. If a business is sold and the Living Shoreline Loan program debt is to be assumed, a business may carry forward the loan debt as part of the business sale, assuming approval is granted by the MPPDC prior to the sale.

- If not, any outstanding principal (and grant) amount must be paid back to the Middle Peninsula Planning District Commission.

G. All beneficiaries must make monthly loan payments by automated clearing house debit from a valid checking or savings account.

II. Vendors: Qualifications & Expectations

A. The MPPDC has a fiduciary responsibility to protect the expenditure of loans/grants. Thus, it sets forth the following qualifying criteria and expectations for vendors to comply.

B. Qualifying businesses need not be located within the Middle Peninsula region, although we encourage and invite businesses with physical footprints within the Middle Peninsula to join.

C. Prospective vendors to be listed on the FTF website must match at least one of the qualifying criteria below to participate in the Fight the Flood business marketplace and have taken and completed appropriate professional training(s), from the Virginia Institute of Marine Science or other universities, colleges, government or other professional programs offering certifications or credentials related to professional trade or profession directly related to the services to be provided.

1. Class A Contractors License
    - Automatically accepted upon proof of successful project completion (project completion statement, closed permit, release of performance bond, etc.)
2. Class B or C licenses
    - Proof of permitted and completed similar jobs, at least 3 jobs within the last 24 months in a Tidewater locality.
3. Other applicable methods presented and accepted by Fight the Flood program manager.

D. To be listed on the FTF website, qualifying vendors shall complete the "Fight the Flood Business Survey" as provided by the MPPDC.

1. The MPPDC shall maintain a database of qualifying vendors and made available to FTF registered property owners who request financial assistance. Property owners are not required to use qualified FTF vendors but are encouraged to.
2. It is mutually understood by all parties that the homeowners select the vendor

E. Participating FTF qualified vendors are encouraged to:

1. Support the FTF program by offering services on discount (5%–15%+) to only those homeowners who are registered in the FTF program;
2. Carry necessary insurance such commercial general liability. Homeowners using any contractor are encourage to ask for proof of insurance: For example, Class A Contractors $1,000,000 Class B and C $500,000-$250,000.

3. Acknowledgement that all financial payments from the MPPDC are released to the homeowner when approval is granted from the appropriate permitting agency denoting the completion of the work.
    - Loan proceeds can be released upon recordation of loan documents
    - Grant proceeds can be released upon satisfactory completion of the job, with proof of acceptance by the permitting agency
    - Some cost can be pre-paid under the program upon issuance of required permits or cost necessary to apply for permits such as design and engineering, etc.
4. Commit to prompt communication with the homeowners

Continued next page

Middle Peninsula Planning District Commission
Living Shoreline Resiliency Incentive Funding Program

Virginia Revolving Loan Fund Program Design
And Guidelines – December, 2015
Amended 6/24/2020
OVERVIEW

The Program Design and Guidelines for the Middle Peninsula Living Shoreline Resiliency Incentive Funding Program (LSIP) will delineate marketing strategies, loan application and review process, environmental review, funds management and administration, and loan agreements with property (residential and business) owners.

This program will provide incentives in the form of funding and insurance for homeowners to install living shorelines in lieu of shore hardening approaches for shoreline stabilization on private property.

I. Marketing Strategy

- Geographic Area of Program: The Program will be available to homeowners of property located in the Middle Peninsula Planning District of Virginia. The localities of the Middle Peninsula are the counties of Essex, Gloucester, King and

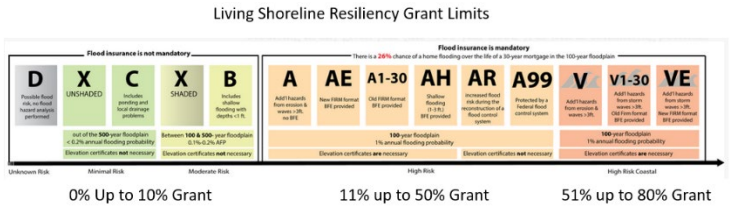
Queen, King William, Mathews, and Middlesex; and the towns of Tappahannock, Urbanna, and West Point.

- Solicitation of Applications: Loan applications will be sought through the following means:

    - Referrals from private sector contractors and engineers.
    - Referrals from Local Governments or other agencies.
    - News releases, Public Information Notices-Newspapers, fliers at public locations, educational displays at Captain Sinclair Landing

- Income Guideline –Residential participation will be based on the household income and ability to pay. Businesses will provide documentation such as profit and loss statement and/or other documentation of adequate business equity to collateralize the public investment). Grant/Loan awards, if available will be based on the program requirements of the source of the funds, if any.

    Unless otherwise dictated by the source of the grant funds, MPPDC will distribute grant funds on a sliding scale according to FEMA Flood insurance zones for any qualified resiliency project that meets the definition of a living shoreline found in § 28.2-104.1 of the Code of Virginia and is designed to attenuate the impinging wave climate across the sill and marsh system during significant storm events. A design will use statistical water levels and wave heights per FEMA flood zones and the fetch exposure referenced in FEMA flood insurance rate study or other qualified study.



- Terms of Loan:

    All loans over $3,000 will be secured with a deed of trust granted to the Middle Peninsula Planning District Commission. Businesses may use a deed of trust, security agreement, UCC Liens etc . The owner of the property must agree that, if the property is sold, transferred, or otherwise conveyed voluntarily, when the owner is living, or if the real estate ceases for any reason to be the owner's principal place of residence, any outstanding principal amount must be paid back to the Middle Peninsula Planning District Commission. If a business is sold and the living shoreline debt is to be assumed, a business may carry forward loan debt as part of the business

sale, assuming approval is granted by the MPPDC prior to sale. If not, any outstanding principal (and grant) amount must be paid back to the Middle Peninsula Planning District Commission

- All beneficiaries must make monthly loan payments by automated clearing house debit from a valid checking or savings account.

-

1. Interest and principal payments will commence as soon as funds are released. Final payment to owner or contractor will not be released until review by VMRC or local wetlands board staff to ensure the project has been completed consistent with the terms and conditions of the VMRC or wetlands permit.
2. Loan interest rates will be at the WSJ Prime Rate as published at http://www.bankrate.com/rates/interest-rates/wall-street-prime-rate.aspx
3. Alternatively, if the applicant has a banking relationship with a lending institution with a physical foot print within the Middle Peninsula, the program will match a verified HELOC rate to a floor of 2% rate. An additional ¼% rate reduction below a verified HELOC rate can be included for any project located in a FEMA A, AE, AH, AR, A99, VorVE flood zone designed to attenuate wave energy and storm surge.
4. In order to close out lending on an existing MPPDC-DEQ-VRA loan, the applicant may negotiate an interest rate to facilitate the closure of any outstanding loan balance to assist the Commission with refunding of the program. A rate floor of 1.5% is established.

5. Low income homeowners may be offered grants and lower interest rates based on household income.

- Loan Process
  - Applicant shall complete application provided by MPPDC
  - MPPDC staff can assist with application as needed
  - Loan terms and payments options will be discussed with client. Loans shall be amortized by monthly installment payments.
  - Completed application will be provided to MPPDC Closing Agent for loan processing and loan closing
  - Applicant and MPPDC will close loan. Loan Closing will take place at the office of the Middle Peninsula Planning District Commission, loan closing agents office or other agreed to location.

- Loan term:

  - Loans of $10,000 or less will be financed for up to 60 months.

- Loans over $10,000 to $35,000 will have the option of financing for up to 120 months.
- Loans over $35,000 will have the option of financing for up to 180 months, with approval from VRA.
- For eligible applicants receiving VRA loan forgiveness, terms of forgiveness will be included within the promissory note. If the applicant pays off the note before maturity, any outstanding loan forgiveness must be repaid and included as part of the payoff calculations. VRA funding for reach based, multi parcel projects will be handled on a case by case basis with terms included in the promissory note(s)

- Property transfer criteria: Balance of the principal of the loan shall be due and payable to The Middle Peninsula Planning District Commission upon sale or transfer of the property.

- Identification of Prior Existing Debt:

  - No subordination of loan shall be done for equity mortgage requests by beneficiary.
  - Applications found to carry a delinquent or defaulted first mortgage shall be ineligible for assistance. Applicants whose property is financed must carry a current first mortgage in good standing. This mortgage must have been current for at least the 12-month period prior to application or since inception of mortgage if in existence less than 12 months.

- Size of Loan: Loans shall not be less than $1,000.

- Fees and Service Charges:

  - Application Fee-$40 required at time of application.

  - Administrative Fee – To be determined based on cost of necessary documentation and closing costs. May be amortized with loan funds.
  - Late Fee-5% charged on unpaid payment due applies when 7 days past due date of payment.

- Security: Individual property owners receiving loans will sign a promissory note for the term of the loan. Loans over $3,000 are to be secured by a Deed of Trust.

- Financing, Permits, Inspections, Contractor Selection and Certification, Disbursement of Funds

  The Middle Peninsula Planning District Commission Living Shoreline Incentive and Funding Program will authorize VRA financing of any project not prohibited by any local ordinance and approved by VMRC or the applicable local wetlands board that satisfies the definition of a living shoreline consistent with § 28.2-104.1 of the Code of Virginia.

  If required by either the permitting agency or terms of a grant award, monitoring of the site, absent other requirements will be required for 3 years after installation following protocol elements outlined in Milligan et al 2019. Monitoring cost can be financed as part of the project.

  Applicants are encouraged to review the MPPDC Fight the Flood Program Design for access to information related to contractor services

  Contractor may request partial reimbursement payment for ordering of materials necessary for the job. Pre-draws will collect interest at the rate agreed to in the promissory note. Accrued interest for pre-draws will be added to the final note payment. Principal and interest payments will commence when the project has been completed.

Final funds will be disbursed to homeowners/contractor only after acknowledgement by local wetlands board and/or VMRC of satisfactory completion of projects.
Homeowner/Contractor shall provide to MPPDC a statement of final project completion

- Insurance Program: Dependent on securing the necessary funding, the Middle Peninsula Planning District Commission Living Shoreline Incentive and Funding Program will "insure" the plants of eligible living shoreline installations for up to two (2) years following initial construction dependent on funds available in the insurance pool program at the time of claim. In the event the plants die, the reason must be explained for the need to be replaced. If applicable, the program will provide grant funds necessary to purchase and replant the same or similar plants in any installation that was previously funded by the program. This insurance can be utilized up to 2 times per project as long as insurance funds remain in the program. All claims must be certified by program partners (VIMS/VMRC)
- Parametric Living Shoreline Insurance policies can be financed as part of the loan package. The applicant may choose how many years of insurance to finance.

II. Loan Application and Review

- Application Guidelines:

- Income Eligibility: An applicant shall complete an Income Eligibility worksheet to determine income qualification for determination of ability to repay loan.

- Application Fee: A $40 application fee shall be charged at the time of application. The fee shall be nonrefundable.
- Place and Time of Application: Applications are available at the offices of the Middle Peninsula Planning District Commission,

Saluda Professional Center, 125 Bowden Street,
Saluda, Virginia between the hours of 8:30 a.m. to 4:30 p.m.,
Monday through Friday, except holidays, by mail request at PO Box 286, Saluda VA 23149, and by phone at (804) 758-2311. A downloadable application is also available at www.mppdc.com

- Review and Approval of Applications:

1. Staff Review- The staff of the Middle Peninsula Planning District Commission will review each application for Completeness and to verify income eligibility.
2. Project Management Committee- The Middle Peninsula Planning District Commission will designate a committee to review and approve each application. If grant funds are available the Committee will determine eligibility for grant funding following the criteria required by the funder or the program design. The Committee shall consider the following in determining project priorities:
    - Need for shoreline management at the project site (in consultation with VMRC staff)
    - FEMA Flood zone
    - Number of projects funded in a jurisdiction - Localities that have never received funding for a project will be given priority
    - Ability to pay – the ability of the homeowner to repay the loan
3. The MPPDC Board may authorize the Executive Director to complete all loan agreements and notes pursuant to approved loans.

III. Administration of VRA Financing Funds

- Security: The Living Shoreline Incentive Funding Program will secure the loan with the Virginia Revolving Loan Fund through the revenues generated through loan payments made by individual property owners and through investment of capital funds.

1. Interest Security- The Program will offer loans at interest rates of WSJ Prime as published at www.bankrate.com

B. Alternatively, if the applicant has a banking relationship with a lending institution with a physical foot print within the Middle Peninsula, the program will match a verified HELOC rate to a floor of 2% rate. An additional ¼% rate reduction below a verified HELOC rate can be included for any project located in a FEMA A,AE,AH,AR,A99,VorVE flood zone designed to attenuate wave energy and storm surge

C. In order to close out lending on an existing MPPDC-DEQ-VRA loan, the applicant may negotiate an interest rate to facilitate the closure of any outstanding loan balance to assist the Commission with refunding of the program. A rate floor of 1.5% is established.

2. Principal Security- The MPPDC Program will borrow funds from the Virginia Resource Authority under terms and conditions agreeable to each party. Historically, VRA has loaned the Commission $250,000 for a period of 15 years at a 0% interest rate, but terms and conditions will vary as the Commission recapitalizes its program over time.
3. Total Annual Security/Annual Debt Payments- At program start up, annual debt payments will be $16.667, to be paid in semi-annual payments of $8,333. Future annual debt payments will vary based on recapitalization of the fund and terms offered by VRA. MPPDC will manage the loan fund and portfolio to ensure repayment of indebtedness.
4. MPPDC will establish a Loan Loss Reserve in the amount of $16,667 or an amount equal to one (1) year debt service payments. These funds will be designated as "Restricted Cash – MPPDC Series 2017 Reserve Fund"" on the MPPDC balance sheet until such time as the loan is repaid in full.

B. Administration:

1. The Middle Peninsula Planning District Commission will dedicate staff personnel to administer the Program. The Executive Director will provide supervisory guidance to the program.
2. The MPPDC will work closely with the State agencies involved in the protection of water quality. The Department of Environmental Quality and the Virginia Marine Resources Council will provide project guidance and assist through the permitting process.

3. The MPPDC Board will designate a Project Management Committee to provide input into the loan review and financial management aspects of the Program. The Board will also be involved in oversight of the entire program.
4. Fund Administration-The Program will invest any undisbursed portion of the loan proceeds with banks operating in the region or the Commonwealth of Virginia Department of the Treasury Local Government Investment Pool. Revenues from loan payments will be invested in said accounts providing liquidity to coincide with debt payments to the VRLF. Interest earnings from the Program will be available for administration costs and loan security. All revenues available after debt payments and administration costs may be utilized to provide additional assistance through the form of additional loans and/or grants to qualified applicants.

IV. Notification of Changes to the Local Program

The MPPDC will notify the Department of Environmental Quality and the Virginia Resources Authority of any anticipated changes to the Program Design at least 60 days prior to the effective date of such changes.

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

REGIONAL ALL HAZARDS MITIGATION PLAN 2021

Participating Middle Peninsula localities include Essex, Middlesex, Mathews, Gloucester, King & Queen, and King William, and the Towns of West Point, Urbanna, and Tappahannock. The federally recognized tribes within the region also participated in this plan update.

Amended on September 31, 2022

Table of Contents

Abbreviations

AHMP All Hazard Mitigation Plan
AQI Air Quality Index
BFE Base Flood Elevation
CDT Central Daylight Time
COA Chief Administrative Officer
CO Carbon monoxide
CO2 Carbon Dioxide
CRS Community Rating System
DCR Department of Conservation and Recreation
DEQ Department of Environmental Quality
EAP Emergency Action Plan
EM Emergency Manager
EOC Emergency Operations Center
EOP Emergency Operations Plan
EPA Environmental Protection Agency
EPRI Electric Power Research Institute
ESC Emergency Services Coordinator
DMA 2K Disaster Mitigation Act of 2000
FEMA Federal Emergency Management Agency
FIRM Flood Insurance Rate Maps
GIS Geographic Information System
HIRA Hazard Identification Risk Assessment
HMA Hazard Mitigation Assistance
HMGP Hazard Mitigation Grant Program
HOI Health Opportunity Index
HRSD Hampton Roads Sanitary District
LPT Local Planning Team
LiMWA Limit and Moderate Wave Action
MCS Mesoscale Convective System
MOU Memorandum of Understanding
MPNHMP Middle Peninsula Natural Hazards Mitigation Plan
MPPDC Middle Peninsula Planning District Commission
MPRWSP Middle Peninsula Regional Water Supply Plan
NCDC National Climatic Data Center
NESIS Northeast Snowfall Impact Scale
NFIP National Flood Insurance Plan
NO_2 Nitrogen Dioxide
NOAA National Oceanic and Atmospheric Administration
NWS Nation Weather Service
O_3 Ozone
OSDS Onsite Sewage Disposal Systems
PA Peak acceleration
PM Particulate Matter
PDM Pre-Disaster Mitigation
RL Repetitive Loss
RP Regional Planner
RSL Relative Sea Level
SLOSH Sea, Lake, and Overland Surges from Hurricane
SO_2 Sulfur Dioxide
TSDA Tribal Statistical Designated Area
USGS United States Geological Survey
VAC Virginia Administrative Code
VDEM Virginia Department of Emergency Management
VDGIF Virginia Department of Game and Inland Fisheries
VDH Virginia Department of Health
VDOF Virginia Department of Forestry
VDOT Virginia Department of Transportation
VFD Volunteer Fire Departments
VRS Volunteer Rescue Squads
VWP Virginia Water Protection
WMO World Meteorological Organization

Executive Summary

Hazard mitigation describes actions taken to help reduce or eliminate long-term risks caused by hazards or disasters. Therefore, with funding from Virginia Department of Emergency Management (VDEM) and the Federal Emergency Management Agency (FEMA), the Middle Peninsula Regional All Hazards Mitigation Plan (AHMP) was updated.

The area covered by this plan includes Essex, Gloucester, King William, King & Queen, Mathews, and Middlesex Counties and the Towns of West Point, Urbanna, and Tappahannock and the three federally recognized Tribe, including the Pamunkey Tribe, Rappahannock Tribe, and the Upper Mattaponi Indian Tribe of the Middle Peninsula. As part of a mitigation planning requirement of the Disaster Mitigation Act of 2000 (DMA 2000), localities and tribes worked to identify, assess, and mitigate risks within their communities to ensure that critical services would continue to function if a disaster were to occur.

The following is an overview of what to expect in the subsequent sections of this Regional AHMP.

Section 1, Introduction, describes reason why the region updated the plan. In part the associated regulations are summarized.

Section 2, Planning Process, provides a narrative description of the process used to prepare the AHMP update. This includes the identification of the Local Planning Team (LPT), and how the public and other stakeholders were involved. It also includes a detailed summary for each of the LPT meetings and any associated outcomes.

Section 3, Community Profiles, describes the planning area of this plan and the general makeup of each locality and tribe.

The Hazard Identification and Risk Assessment (HIRA) is presented in Section 4. This section serves to identify, analyze, and assess the Middle Peninsula region's overall risk to hazards. The risk assessment also attempts to define any hazard risks. In part, Section 5, is the HAZUS. FEMA's HAZUSMH loss estimation methodology was used in evaluating known hazard risks by their relative long-term cost in expected damages. In essence, the information generated through the risk assessment serves a critical function as communities seek to determine the most appropriate mitigation actions to pursue and implement — enabling communities to prioritize and focus their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risk(s). The hazards analyzed in this plan include hurricane wind, flooding, and sea level rise.

Section 6, Capability Assessment, is a review of the capabilities and tools that each locality and tribe have or have access to in order to achieve mitigation actions.

A review of the 2016 mitigation strategies is in Section 7 of the plan. Each locality provided status updates to the mitigation strategies in the 2016 AHMP. This section also reviewed other mitigation actions taken by the localities within the past 5 years.

Section 8, New Mitigation Goals, Objectives, and Strategies, list the goals, objectives and strategies that aim to reduce or prevent injury from hazards to residents, communities, state facilities, and critical facilities. Each locality and tribe reviewed the list of mitigation strategies and selected strategies to participate in over the next 5-years. Within this section goals, objectives and strategies clearly identify the mitigation intent and then there is a list of localities that will work to achieve the strategy. This section also includes strategies that have been canceled and/or completed by a locality.

Section 9, Implementation Plan, reviews how each locality and tribe plan to implement and complete the hazard mitigation goals, objectives and strategies.

Section 10, Plan Adoption, lists the dates that the AHMP update was adopted by each locality and tribe.

Finally, Section 11, Plan Maintenance, include the measures that the MPPDC and participating jurisdictions will take to ensure the Plan's continuous long-term implementation. The procedures also include the manner in which the Plan will be regularly evaluated and updated to remain a current and meaningful planning document.

Section 1: Introduction

The Disaster Mitigation Act of 2000 (DMA 2K) is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation actions. The DMA 2K amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act (Stafford Act) and is designed to improve planning for, response to, and recovery from disasters by requiring state and local entities to implement pre-disaster mitigation planning and develop hazard mitigation plans. This legislation specifically established the Pre-Disaster Mitigation (PDM) Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program (HMGP). This key piece of federal legislation is known as Public Law 106-390.

DMA 2K requires local governments to develop and submit mitigation plans to qualify for Hazard Mitigation Assistance (HMA) funds. The Act requires the plan to demonstrate "a jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards." The final mitigation plan update is reviewed by the Virginia Department of Emergency Management (VDEM), approved by Federal Emergency Management Agency (FEMA), and then adopted by each participating jurisdiction.

To meet such requirements, Middle Peninsula Planning District Commission (MPPDC) staff guided the development and update of the Regional All Hazards Mitigation Plan (AHMP) inordinance with DMA 2K. All nine (9) Middle Peninsula localities, including Essex, Gloucester, King & Queen, King William, Mathews, and Middlesex Counties and the Towns of Tappahannock, Urbanna, and West Point, participated in the plan. In addition to the nine regional localities, the three federally recognized Indian Tribes in the region, including the Pamunkey Tribe, Upper Mattaponi Indian Tribe, and the Rappahannock Tribe, were invited to participate in the 2021 AHMP update.

As this plan follows DMA 2K planning requirements and associated guidance documents for developing Hazards Mitigation Plans, a four-step mitigation planning process was utilized (FEMA, 2015):

The planning process helps prepare citizens and government agencies to better respond when disasters occur. Also, mitigation planning allows participating localities and tribes, to remain eligible for mitigation grant funding for projects that reduce the impact of future disaster events. Eligible projects may include property acquisition and structure demolition, structure elevation, localized flood risk reduction projects, infrastructure retrofits, soil stabilization, wildfire mitigation, post-disaster code enforcement, wind retrofits for one- and two-family residences, and planning related activities. The long-term benefits of mitigation planning include the following:

- An increased understanding of hazards faced by the Middle Peninsula region.
- Building more sustainable and disaster-resistant communities.
- Increasing education and awareness of hazards and their risks.
- Developing implementable and achievable actions for risk reduction.

- Financial savings through partnerships that support planning and mitigation efforts.
- Reduced long-term impacts and damages to human health and structures.

This AHMP also utilizes the elements outlined in FEMA's Local Mitigation Plan Review Tool and Local Mitigation Planning Handbook, published in 2020 and March 2013, respectively.

Section 2: The Planning Process – Public Involvement and Community Partners

The Middle Peninsula Planning District Commission's (MPPDC) Senior Planning Project Manager led and facilitated the 2021 update of the Regional All-Hazards Mitigation Plan (AHMP). All nine Middle Peninsula localities participated and contributed substantial staff time to the development and update of this plan. In addition to time spent, each locality financially contributed to this effort in order to meet FEMA funding match requirements. To begin this project and to realize local commitments, MPPDC staff drafted a Memorandum of Understanding (MOU) for each locality to sign. The MOU outlined the terms of agreement between the MPPDC and the locality concerning financial obligations of the local adoption of the 2021 Regional AHMP. In response, each locality reviewed and signed the MOU (Appendix A).

As per the MOU, localities appointed two local representatives to service on the Local Planning Team (LPT). The LPT helped determine the plan's outcomes and substantive content. The LPT consisted of locality staff with varying backgrounds and experience. Please see Appendix B for a list of LPT participants and positions. Also in an effort to utilize the expertise of professionals with knowledge of natural hazard mitigation efforts and/or actively involved in one or more of the 4 phases of emergency management – preparedness, response, prevention/mitigation, or recovery - MPPDC staff invited representatives from Virginia Department of Conservation and Recreation (DCR) – Floodplain Division, Virginia Department of Emergency Management (VDEM), Virginia Department of Transportation (VDOT) – Saluda Residency, the National Weather Service, U.S. Corps of Engineers, Virginia Department of Health (VDH), Virginia Department of Forestry (VOF), Virginia Coastal Policy Clinic (VCPC), Old Dominion University, and the assistant to the Governor for Coastal Adaptation and Protection. Finally, to round out the LPT, MPPDC staff invited representatives from the three federally recognized tribes within the region, including the Pamunkey Tribe, Upper Mattaponi Indian Tribe (UMIT), and the Rappahannock Tribe.

This Plan also includes brief profiles of the three federally recognized Native American tribes that share land within the Middle Peninsula. The MPPDC's effort and those of the tribal governments are separate and autonomous efforts. While the tribes are independent, sovereign nations, they did consult on the LPT in this effort. Tribes are important stakeholders in the region, and the MPPDC recognizes that tribal level plans can support or enhance hazard mitigation in the planning area and provide an opportunity to partner and share information that may help leverage resources.

The UMIT, along with many other Native communities across the region, have a complex history, undergoing many challenges and events that have threatened their traditional ways of life, culture, land, and ultimately, their survival. The centuries-long struggle of Native nations to maintain cultural identity and sovereignty has greatly contributed to the historical legacy of these communities. Nevertheless, Tribal communities, including the UMIT, have persisted, their knowledge and traditions living on through the generations.

Due to the rural nature of the Middle Peninsula area, there were no private not-for profit environmental organizations based in the region that were identified by LPT members at the onset of the planning phase of this project that could provide meaningful input. In conjunction with the LPT, Middle Peninsula Planning District Commissioners, consisting of elected officials and citizen representatives were kept abreast of the progress made throughout the plan update process through written staff reports at monthly committee meetings.

A list of the Planning Team members can be found in Appendix B. LPT meeting minutes, agenda, and presentations have been posted and are available on the MPPDC website.

2.1. Project Timeline for Update

Financial support for the AHMP update was provided by FEMA and VDEM, and matching funds contributed by the nine localities of the MPPDC. Table 1 provides a timeline of the project and associated tasks of this 2-year project.

Table 1: Project timeline and associated tasks

Task	Starting Point	Unit of Time	Duration	Work Completed By
Grant Implementation and kickoff	1-60	Days	60 days	Regional Planner (RP)
Organize Resources: 1. Form a Mitigation Advisory and Planning Committee 2. Award HAZUS Contract 3. Inventory available resources/collect data 4. Begin Public Outreach Efforts	61-151	Days	90 days	RP and LPT
Revise Hazard Identification and Risk Assessment 1. Compile and analyze data for HIRA analysis 2. Vulnerability assessment/ loss identification 3. Provide HIRA, vulnerability & loss estimation analysis to public 4. VDEM review of HIRA, vulnerability & loss estimation analysis	152-362	Days	210 days	RP, LPT VDEM, and FEMA
Community Assessment/Profile 1. Review current community profiles with each locality	363-483	Days	120 days	RP and LPT
Coordination with Tribes	484-574	Days	90 days	RP
Revise Mitigation Plan 1. Update mitigation goals, strategies and actions 2. Solicit/incorporate public comments 3. Prepare implementation strategy 4. Compile/ review draft plan 5. Solicit / incorporate public comment on final draft 6. VDEM/FEMA review and final plan	575-740	Days	165 days	RP, LPT, VDEM, and FEMA
Adoption and Implementation 1. Final VDEM/FEMA review and plan approval 2. Publish VDEM/FEMA approved HMP for public distribution 3. Each Locality adopts the plan	741-831	Days	90 days	RP/VDEM/FEMA
Project Closeout with VDEM	832-922	Days	90 days	RP/VDEM

Beginning in January 2021, MPPDC staff hosted regular meetings of the AHMP LPT. The LPT guided the development of the plan, including hazard identification, capability assessment, mitigation strategy reporting, strategy development, and plan adoption. While locality and tribal representatives provided information specific to their communities, state and federal agency representatives offered their expertise and experience about hazards, mitigation, and funding opportunities. The LPT completed the following tasks within the timeframes noted below:

Task 1 - Hazard Identification/Capability Assessment

The AHMP LPT completed a series of 5 tasks using the hazard worksheets provided by VDEM staff to:

1. Identify all natural hazards.
2. Compile a history detailing the nature of each identified hazard.
3. Develop an inventory of assets that are at risk from each identified natural hazard.
4. Write a narrative describing the vulnerability of the community's assets to these natural hazards.
5. Assess their localities or Tribe's capability to use the local regulatory tools and the jurisdiction's technical staff to implement hazard mitigation activities.

To gather the appropriate information, LPT were asked to complete hazard worksheets by March 19, 2021, in order to provide the Regional Planner time to compile community assessments by the March 29th LPT meeting.

Next a Hazards Identification and Risk Assessment (HIRA) was conducted using the HAZUS version 4.2 software from FEMA. MPPDC staff contracted with Dewberry to have this assessment completed. Results anticipated damages from hurricane winds, flooding, and sea level rise.

In conjunction with HAZUS, the Natural Hazards ranking, developed by the Kaiser Permanente Model, from the 2016 AHMP was made available to the LPT for reference and to update the plan. Upon review one new hazard was added to the list and the other regional hazards were re-ranked.

Task 2 - Review of the Strategies from the 2016 AHMP

At the March 29, 2021, meeting of LPT, the Regional Planner reviewed each strategy within the 2016 AHMP. Each locality was able to review the strategies they committed to in 2016 and had an opportunity to make changes as a reflection of their local mitigation progress and local priority changes. Additionally, jurisdictions were provided with a spreadsheet to report the status - completed, deleted, not started, cancelled or in progress - of the mitigation strategies since 2016. Tribes also had the opportunity to review the mitigation strategies, commit to those that they felt were appropriate for their Tribe, or develop new mitigation strategies.

The LPT was asked to update this information on April 6, 2021, and return the updated spreadsheets by April 30, 2021, for inclusion into the plan.

Task 3 - Inform the Public – Hazard Identification/Assessment Phase

Once the natural hazards were identified and assessed, the LPT solicited comments from Middle Peninsula citizens. Through a public survey launched on a March1st, the survey requested feedback on local hazards and thoughts on mitigation actions. Mitigation actions can be defined as any action taken to reduce or eliminate the long-term risk to human life and property from hazards. The survey closed on March 15th and data was analyze. For all survey response see Appendix C.

To advertise this survey, the link was posted on the MPPDC website and was advertised on the MPPDC Facebook page.

Task 4 - Develop Goals and Objectives

At the March 29, 2021, LPT meeting, the group reviewed mitigation goals from the 2016 AHMP and decided no changes would be needed to the regional goals and objectives for the AHMP update. The LPT reviewed the criteria used to develop their mitigation strategies and again decided to make no changes.

The evaluation criteria used to develop the mitigation strategies included the following:

Social Considerations

1. Will the proposed strategy be considered acceptable to the residents?
2. Will the proposed strategy treat all residents of the locality equally?
3. Will the proposed strategy cause any social disruption in the community?

Technical Considerations

1. Will the proposed strategy work?
2. Will the proposed strategy create more problems than it solves?
3. Will the proposed strategy solve the problem or just mask a symptom?
4. Is the proposed action in line with other locality goals?

Administrative Factors

1. Does the locality have the capacity to implement the proposed strategy?
2. Who in the locality will spearhead the strategy?
3. Is there sufficient funding, staff, and technical support to undertake this effort?

Political Considerations

1. Will members of the governing body accept and support the proposed strategy?
2. Is there support to implement and maintain the proposed strategy by members of the governing body?

Legal Issues

1. Is the locality legally authorized to undertake this proposed strategy?
2. Will the proposed strategy constitute a legal taking?
3. Is the proposed activity in compliance with the jurisdiction's comprehensive plan?
4. Will the locality face legal liability if the proposed strategy is not implemented or conversely, legally challenged if the strategy is implemented?

Economic Concerns

1. What are the costs and the benefits of implementing the proposed strategy?
2. Do the benefits outweigh the costs? Construction projects seeking FEMA financial assistance to mitigate the adverse effects of natural hazards will utilize FEMA's Benefit/Cost Formula to ensure that the proposed project benefits exceed the anticipated project costs.
3. Are the capital, maintenance and administrative costs accounted for with the proposed strategy?
4. Has the funding been secured for this project?
5. What burden will this strategy place on the locality's tax base or local economy?
6. Does the proposed strategy contribute to other jurisdictional goals?

Environmental Factors

1. What affect will the action have on the environment?
2. Will this action need environmental regulatory approvals?
3. Approvals from whom and does this create any concerns about the feasibility of the proposed action?

Task 5 - Strategy Development

At the March 29, 2021, LPT meeting, the members developed and updated mitigation strategies to address the hazards that were determined to adversely affect their communities. The Rappahannock Tribe assessed the mitigation strategies within the plan and committed to 10 strategies.

Task 6 - Inform the Public – Strategy Development Phase

The LPT updated and developed mitigation strategies. This task was completed at the September 10, 2021, LPT meeting. These mitigation strategies were included in the Plan and were available to the public comment during from October 17, 2021, to November 1, 2021. This public comment period was advertised on the MPPDC website and on the MPPDC Facebook page.

Task 7 - Draft Plan

The draft plan was completed by October 29, 2021 and posted for public comment from October 17th to November 1st. The plan was posted on the MPPDC website and on the Facebook page. According to Facebook analytics the post reach (i.e., the number of people who saw a specific post in their news feed) was 1,422, the post impressions (i.e., the total number of times a post was visible in user timelines or feeds) was 1,623, and post engagements (i.e., the total number of actions that people take involving your content on Facebook) was 37. Even with this extensive reach no comments were made.

MPPDC staff also sent invitations to neighboring communities (ie. Louisa County, Richmond County, Westmoreland County, Lancaster County, New Kent County, Hanover County, and the Northern Neck Planning District Commission), local and regional agencies involved in hazard mitigation (Virginia Department of Health, Virginia Department of Emergency Management, Virginia Department of Conservation and Recreation, Virginia Department of Forestry, and the National Weather Service) and agencies that have the authority to regulate development (ie. County and town planners). Appendix D includes the invitations to review the draft AHMP and provide feedback or insight to improve the plan. No substantive comments were made.

With no comments or feedback, the plan was packaged and submitted to VDEM/FEMA for their review and approval.

Task 8 - Adoption

Once VDEM/FEMA staff gave conditional approval of the draft plan, jurisdictional staff presented the updated plan to their Board of Supervisors, Town Council, or Tribal Council and requested the plan's adoption.

Once adopted, locality and tribal staff began with the implementation phase of the strategies based on the schedule outlined in Section 9 of the update.

Task 9 - Public Input during Plan Development

A three-part public outreach strategy was implemented to keep the public informed of AHMP updates and to request their assistance in plan develop:

1. **OUTREACH METHOD:** Public Information Website (including Social Media Integration)
   AVAILABILITY: Throughout the plan update.
   BRIEF DESCRIPTION: A project information website was hosted by the MPPDC and was available to the general public, neighboring local governments, schools, local, state and federal partners, participating jurisdictions and tribes, and the LPT for the duration of the project at the following web address: https://mppdc.com/index.php/service-centers/mandates/hazards. On the website the Regional Planner contact information was listed, therefore was an opportunity of all parties to reach out to provide input and/or ask questions. Additionally, Consociate Media posted news releases about the plan on the MPPDC Social Media pages (i.e. Facebook and Twitter) on March 1, 2021, and October 18, 2021. Copies of the press releases and the corresponding Facebook statistics are included in Appendix E.
   DETAILS: Specific resources included on the site were:
   - Project information fact sheet
   - Drafts of the Regional AHMP
   - List of LPT participants
   - List of project tasks and general timeline
   - PowerPoint files from LPT meetings and minutes
   - PDF of existing local hazard mitigation plans for reference during the plan update process
   - Links to planning resources, including recently published FEMA hazard mitigation planning guidance
     - FEMA mitigation planning guidance
       - Local Mitigation Planning Handbook
       - Mitigation Ideas
       - Integrating Hazard Mitigation into Local Planning
   - Social media integration including MPPDC Facebook

2. **OUTREACH METHOD**: Project Information Fact Sheet
   AVAILABILITY: Throughout the plan update and on the public information website.
   BRIEF DESCRIPTION: A one-page (double-sided) project information fact sheet was available on the MPPDC website in PDF format for the duration of the project. The primary purpose of this document was to provide information on the regional planning process and to provide project contact information and links for interested parties to engage in the planning effort. Printed copies were also made available on an as-needed basis.
   DETAILS: Specific information provided on this fact sheet included:
   - Project overview (who, what, where, when, how)
   - Overview of the regional hazard mitigation planning process, including:
     - Public outreach
     - Risk assessment
     - Capability assessment
     - Mitigation strategy development
     - Plan maintenance
     - Plan adoption
   - Explanation of project leadership, including the LPT and project manager.
   - Project schedule
   - Contact information and links to project information website
   - Project graphics/illustrations

3. **OUTREACH METHOD:** Public Participation Survey
   AVAILABILITY: During the hazard identification and mitigation strategy review
   BRIEF DESCRIPTION: An online public participation survey hosted by MPPDC using the SurveyMonkey and was opened to the public on March 1st and closed March 15th. The primary purpose of the survey was to solicit input about local hazard concerns and mitigation actions of interest, and feedback on the plan update. The survey was accessible through hyperlinks posted on the project information website, locality websites, and circulated via email and Facebook. The feedback received was be evaluated and incorporated into the LPT's decision-making process and the final plan.
   DETAILS: Types of questions asked on the survey, included, but were not limited to:
   - Personal history with natural hazards
   - Natural hazard concerns
   - Perception of vulnerable community assets
   - Importance of community assets
   - Priorities concerning natural hazard preparedness
   - Steps local government can take to reduce natural hazard risk
   - Types of mitigation activities deemed important
   - Personal interest in natural hazard mitigation
   - Effective ways to communicate with residents
   - Location in the floodplain
   - Questions regarding flood insurance
   - Personal actions to mitigate property
   - Mitigation activities planned for the respondent's household
   - Location within the planning area
   - Age (optional)*
   - Gender (optional)*
   - Highest level of education (optional)*
   - Length of time living in the planning area
   - Ownership of property versus rental status
   - Type of dwelling
   - Open comments**

4. **OUTREACH METHOD:** Public Comment
   AVAILABILITY: 2-week comment period
   BRIEF DESCRIPTION: Upon completion of the draft plan, MPPDC staff posted the draft on the MPPDC website page and advertised on Facebook that the plan was available for public comment. The draft plan was also advertised on community websites and social media pages to encourage public input. The public comment period was open on October 18th and closed on November 1st.

Upper Mattaponi Tribe

The Upper Mattaponi Indian Tribe (UMIT) began the planning process with the Middle Peninsula Planning District in the spring of 2021 and in conjunction with the available resources from the Commonwealth of Virginia and the Virginia Department of Emergency Management.

However, due to limited capacity, the majority of the planning process began upon the hire of the Emergency Management Coordinator in December 2021. The UMIT planning team consisted of the Emergency Management Coordinator, Environmental and Cultural Protection Director, and the Tribal Administrator. Once the plan was completed, the final draft was submitted to the Tribal Council, including the Chief, to review and approve. Due to the condensed timeline, the planning

team did not include any tribal citizens; however, for future reviews and plans, tribal citizens will be asked for input.
The UMIT defines the public in regards to emergency management as any tribal citizen or anyone on tribal land that may be impacted by an emergency event. This encompasses tribal government employees, Aylett Family Wellness employees and patients, and any visitors, including tribal citizens.

The current plan has not been submitted for review by tribal citizens. Due to limited capability and time constraints, a small planning team was created to complete the project. For future iterations, a larger planning team will be assembled, comprised of additional tribal staff and tribal citizens. The UMIT holds a monthly meeting for all staff and tribal citizens, which includes tribal government updates. At a monthly meeting, the Emergency Management Coordinator will explain what the Hazard Mitigation Plan is and what the ask is for tribal citizens to review the plan. Based on the response, the Emergency Management Coordinator will partner with tribal citizens to further review the current plan and make changes based on tribal citizen concern, questions, and priorities. The Tribe will continue to use all communication methods, including a quarterly newsletter and website to engage the community in emergency management opportunities. Much of the tribal community resides in the ancestral land of Tsneacomacah, however, there are UMIT citizens in over thirty states. While the services of emergency management will differ based on location, the Department of Emergency Management intends to include all tribal citizens, regardless of location, in as many aspects as possible.

Rappahannock Tribe
The Rappahannock Indian Tribe fully participated in the develop of the Middle Peninsula AHMP. The Rappahannock Tribe planning team consisted of Chief G. Anne Richardson, Grant Writer and Strategic Planning Assistant Pat Morris, Director of Emergency Management Steven Nelson, and the Housing Department Jerry Fortune. The Rappahannock Tribal Citizens and other planning district area residents were able to access the public information on the MPPDC website and social media platforms to gain plan awareness and provide feedback direct to the planning team as well to the Rappahannock Tribe. The Rappahannock Tribal Citizens and other planning district area residents were also able to access the public survey advertised by the MPPDC to provide input and feedback on plan development. The public participation survey forwarded by the MPDDC was used to solicit input from Elder Tribal Citizens. It was also made available to key staff and long-time area residents as a tool to gain their input on the items addressed. Other than a few direct inquires of area residents for feedback on the survey, no additional public comment was solicited beyond that undertaken by the MPPDC.

During future iterations of the plan, Tribal Citizen involvement and participation in the plan development, revisions and adoption will be increased. The Tribe is planning additional communications to Tribal Citizens via email and social media, website about meeting opportunities, draft review, surveys, feedback opportunities, and the adoption process. Tribal communications tools are currently being developed to improve our ability to accomplish this goal.

The Rappahannock Indian Tribe defines a Tribal Citizen is a citizen of a sovereign tribal nation. Sovereignty is a legal word for an ordinary concept—the authority to self-govern. Hundreds of treaties, along with the Supreme Court, the President, and Congress, have repeatedly affirmed that tribal nations retain their inherent powers of self-government. Currently, 573 sovereign tribal nations (variously called tribes, nations, bands, pueblos, communities, and Native villages) have a formal nation-to-nation relationship with the US government. These tribal governments are legally defined as "federally recognized tribes." Two-hundred-and-twenty-nine of these tribal nations are located in Alaska; the remaining tribes are located in 35 other states. In total, tribal governments

exercise jurisdiction over lands that would make Indian Country the fourth largest state in the nation. Finally, the Rappahannock Tribe defines public as the general population in the area (non-Tribal Citizens).

Summary of Local Planning Team Actions

During the update process, the LPT was instrumental in reviewing and updating the AHMP. The following table is a record of LPT participation in the AHMP updates, including meeting attendance, information requests, and section reviews.

This table provides record of meeting attendance for all Local Planning Team participants. The green squares represent participation in the meeting, the red squares represent no attendance at the meeting, light green squares represent no participation in the meeting, but the regional planner touched base with the entity after the meeting.

Name	Locality	Meeting 1 (012521)	Meeting 2 (020821)	Meeting 3 (022221)	Meeting 4 (032921)	Meeting 5 (042621)	Meeting 6 (062621)	Meeting 7 (072621)
Local Planning Team Appointed by Middle Peninsula Localities								
Jimmy Brann	Essex County	✓	✓	✓	✓			✓
Trent Funkhouser	Essex County					✓		✓
Willie Love	Mathews County	✓	✓	✓	✓		✓	
James Knighton	Mathews County	✓	✓	✓	✓		✓	✓
David Kretz	Middlesex County		✓	✓	✓		✓	✓
David Laymen	Middlesex County		✓	✓	✓		✓	✓
Steve Hudgins	King William County	✓	✓	✓		✓	✓	✓
Sherry Graham	King William County	✓	✓	✓		✓		✓
Donna Sprouse	King & Queen County	✓				✓	✓	✓
Greg Hunter	King & Queen County							
Kevin Harris	King & Queen County		✓		✓	✓		
Brent Payne	Gloucester County	✓		✓	✓	✓	✓	✓
Brett Major	Gloucester County	✓	✓	✓	✓			✓
Holly McGowan	Town of West Point	✓	✓	✓		✓	✓	✓
John Edwards	Town of West Point	✓	✓	✓	✓	✓	✓	✓
Barbara Hartley	Town of Urbanna							
Garth Wheeler	Town of Urbanna				✓			✓
Eric Pollitt	Town of Tappahannock							
Frank Sanders	Town of Tappahannock			✓				
Partnering Organizations invited to Participate on the Planning Team as they are resources and/or experts with regards to hazards and mitigation responses.								
Angela Davis	DCR		✓	✓	✓			✓

Brandy Buford	DCR-Floodplain Management	✓	✓	✓	✓	✓		✓
Michael Barber	DCR-Floodplain Management	✓	✓	✓	✓			✓
Joyce McGowan	VDOT	✓	✓		✓			
Ronald Peaks	VDOT	✓						
Matt Carpentier	VDH							
Eric Seymour	National Weather Service	✓		✓	✓	✓		✓
Harrison Bresee	VDEM	✓		✓	✓	✓	✓	✓
Amanda Weaver	VDEM					✓	✓	✓
Alexander Krupp	VDEM	✓						
Ken Sterner	VDOF			✓	✓	✓	✓	✓
Heather Tuck	VDOF	✓	✓	✓				
Robert Gray	Pamunkey Tribe	✓						
G. Anne Richardson	Rappahannock Tribe							
Patricia Morris	Rappahannock Tribe	✓	✓					
W. Frank Adams	Upper Mattaponi	✓	✓					
Leigh Mitchell	Upper Mattaponi	✓	✓	✓	✓			
Ann Phillips	State							
Other Attendees								
Elizabeth Andrews	VCPC	✓						
Wie Yusif	Old Dominion	✓						
Steven Nelson	Rappahannock Tribe Rep			✓	✓	✓		✓
Chief Stacy Reaves	King William				✓			
Liz Bartol	King William				✓			
Denise Nelson	Berkley Group						✓	
Luke Rogers	Berkley Group						✓	
Lewis Lawrence	MPPDC						✓	

This table lists the participating localities and tribes as well as the task and the date that information was due back to the regional planner. The regional planner would take the information provided by the locality and tribe and update the plan. The check marks show the localities and tribes that provided feedback for each task.										
Locality/Tribe	**Task Check List**									
	1 - Community Profile Review (due: 2/5/21)	**2- Hazards Survey (due: 2/17/21)**	**3 - Community Assessment Survey (due: 2/19/21)**	**4 - NFIP Survey (due: 2/19/21)**	**5 - Hazards Assessment (due: 3/19/21)**	**6 - Mitigation Strategy Status Updates (due: 4/30/21)**	**7 - Implementation Plan (due: 4/30/21)**	**8 – Review of 2016 Mitigation Strategies (due: 8/13/21)**	**9 – Local Plan Coordination and Integration (due 9/15/21)**	**10 - Recovery/ Mitigation Projects (due: 9/15/21)**
Town of West Point	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
King William County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Gloucester County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
King & Queen County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Mathews County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Essex County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Town of Tappahannock	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Town of Urbanna	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Middlesex County	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Upper Mattaponi Tribe		✓						NA		
Rappahannock Tribe	✓	✓	✓	✓	✓	✓	✓	NA	✓	✓
Pamunkey Tribe					✓			NA		

A brief summation of LPT contributions include:

1. Meetings: Throughout the course of this project the LPT meet on 7 separate occasions to discuss the plan update. Meeting dates were:

   January 25, 2021
   February 8, 2021
   February 22, 2021
   March 29, 2021
   April 26, 2021
   June 28, 2021
   July 26, 2021

   For meeting minutes visit the MPPDC website.

2. January 25, 2021
   - Introduced the AHMP
   - Reviewed project timeline
   - Reviewed HAZUS options for contracting with Dewberry
   - Reviewed Community Profiles and requested edits

3. February 8, 2021
   - Reviewed hazard ranking from the 2016 AHMP and the Kaiser Permanente Hazard Vulnerability Tool.
   - Finalize public outreach process for this the AHMP Update

4. February 22, 2021
   - Completed hazard assessment
   - Reviewed the public survey to be published
   - Reviewed the Hazards assessment
   - Reviewed the 2016 Mitigation Strategies

5. March 29, 2021
   - Reviewed the results from the public survey
   - Finalized the review of the 2016 Mitigation Strategies

6. April 26, 2021
   - Provided the LPT with an overview of the Middle Peninsula Fight the Flood program

7. June 28, 2021
   - Contracted with Dewberry to complete a regional HAZUS analysis (ie. flooding, hurricane winds, and sea level rise).
   - Reviewed 2010 Mitigation Strategies.

8. July 26, 2021
   - Reviewed HAZUS results provided by Dewberry

Summary of Primary Revisions of the 2021 AHMP

The below will list the sections of the plan and updates that the AHMP LPT made to keep this plan current.

SECTION 2: THE PLANNING PROCESS – PUBLIC INVOLVEMENT AND COMMUNITY PARTNERS

Executive Summary – This section was added to the beginning of the AHMP to provide an introduction and summary of findings with the AHMP update.

Section 1 – Introduction

- Included the participation of three Federally recognized tribes within the Middle Peninsula, including the Pamunkey, Upper Mattaponi, and the Rappahannock Tribes.

Section 2 – Planning Process

- Updated the planning process to reflect the activities that took place during the plan update, including meetings and locality and tribal participation.

Section 3 – Community Profiles

- Updated community profiles and included a community profile for the Rappahannock Tribe.
- Updated community profiles and included a community profile for the Upper Mattaponi Indian Tribe.
- Updated the Economic Resiliency within the Middle Peninsula and removed the Health Opportunity Index from Virginia Department of Health (VDH) since this was not directly used in the assessment of hazards within the region.

Section 4 – Hazard Assessment

- Added communicable diseases to the list of hazards impacting the Middle Peninsula region.
- Removed Tsunamis, Landslides and Volcanoes from the Hazards List as the LPT found these hazards to be of little to no risk to the region.
- Consolidated hazards, including:
    - Winter Storm (ice) and Winter Storm (snow) to WINTER WEATHER
    - Coastal, Riverine, and ditch flooding hazards to FLOODING
    - Extreme cold and extreme heat to EXTREME TEMPERATURES
- Updated the prioritization worksheet for hazards impacting to include the new hazard listed above and the LPT reassessed and re-prioritized hazards. In 2016 the critical hazards included Winter Storms (Ice), Coastal Flooding, Lightning, Hurricanes, and Summer Storms. whereas in the 2021 updated plan the most critical hazards included: Summer Storms, Winter Weather (ice & snow), Hurricanes, Communicable Disease, and Flooding.
- Updated the Repetitive Loss and Severe Repetitive Loss data.
- Updated the flood plain maps
- Updated wildfire data for 2015-2020 events
- Updated storm event data within the Region
- Updated Virginia Earthquakes map from the 2018 Commonwealth of Virginia Hazard Mitigation Plan.
- Added Point Source Emissions Inventory and air quality index to describe air quality in the region
- Utilized the Emergency Action Plans (EAP) for the high hazard dams, including Cow Creek Mill Pond Dam and Beaverdam Reservoir Dam, in Gloucester County to update the Dam Failure information.

Section 5 – Hazus Assessment

- The flood, hurricane wind, and sea level rise analysis for the HIRA was completed using the FEMA Hazus – MH Version 4.2 software. In part it included updated data including:
    - All GIS grid products are in Universal Transverse Mercator (UTM) Projection with X,Y (North American Datum of 1983), and Z units (North American Vertical

Datum of 1988) in Feet. All GIS grid products were created or converted to a 10-ft grid cell size for analysis.
    - Digital Elevation Model (DEM) – National Elevation Dataset (NED) One-Arc Second (~30 meter resolution)
    - Frequencies (Both Riverine & Coastal hazards) - 0.2%, 1%, 2%, 4%, and 10%. No grid is created representing an annualized depth of flooding. Annualized results are derived from the loss estimation.
    - FEMA's Riverine and Coastal analysis is completed by Hydrologic Unit Code (HUC) and data from two HUCs were available to be incorporated as a Level 2 update for flood hazard analysis. These HUCs provided updated data for portions of Essex, King & Queen, Middlesex, Gloucester, and Mathews Counties. FEMA does not have updated data for King William County.
    - Level 2 assessment was conducted for Coastal flooding:
        - FEMA's detailed engineering analysis provided an update to the one percent-annual chance return period for coastal hazards that combines both surge and wave run-up analysis for a limited spatial area.
        - "Starting Stillwater Elevations" as published in the Flood Insurance Study's (FIS) Table 2 – Transect Data (see each FEMA FIS document for the table details) from each respective FEMA Flood Insurance Study (FIS) to develop depth grids for return periods other than the one-percent-annual chance:
            - ESSEX COUNTY – Revised May 4, 2015
            - GLOUCESTER COUNTY – Revised November 19, 2014
            - KING AND QUEEN COUNTY – Preliminary October 3, 2013
            - KING WILLIAM COUNTY – Preliminary October 3, 2013
            - MIDDLESEX COUNTY – Revised May 18, 2015
            - MATHEWS COUNTY – Revised December 9, 2014
        - Hazus default shoreline data was modified to extend up the York River so that Level 1 coastal modeling could be completed for King William County, King and Queen County, and portions of Gloucester County upstream of the George Washington Memorial Highway Bridge (US 17).
- Methodology of Hazus analysis has been added to the Appendices (Appendix G).

Section 6 – Capability Assessment

- Updated capability assessment tables that focus on the planning and regulatory, administrative, and technical, education and outreach, and financial capabilities of each Middle Peninsula locality and for the Rappahannock Tribe.
- Added National Flood Insurance Program compliance tables to the report (Appendix H)
- Added capabilities of the Upper Mattaponi Indian Tribe and the Rappahannock Tribe.

Section 7 – Review of Strategies from the 2016 Regional AHMP

- Updated the status of mitigation strategies for localities.
- Added information about the Rappahannock Tribe and their efforts in mitigation.

Section 8 - New Mitigation Goals, Objectives, and Strategies

- In sections that mentioned flood proofing, nature-based solutions were added as a mitigation action.
- Included information about the Middle Peninsula Fight the Flood Program to assist with educational endeavors and flood proofing efforts.
- Updated repetitive loss and severe repetitive loss properties in the Middle Peninsula.

SECTION 2: THE PLANNING PROCESS – PUBLIC INVOLVEMENT AND COMMUNITY PARTNERS

- Updated flood prone roads in Strategy 1.1.6
- Updated strategies with localities interested in participating:

Strategy	Localities and Tribes added to the Strategy
1.1.1	Upper Mattaponi Indian Tribe
1.1.3	Town of Urbanna and Upper Mattaponi Indian Tribe
1.1.4	Rappahannock Tribe and Upper Mattaponi Indian Tribe
1.1.5	King & Queen County
1.1.7	Town of Urbanna
1.1.8	Upper Mattaponi Indian Tribe
1.1.9	Upper Mattaponi Indian Tribe
1.1.10	Gloucester County
1.1.11	King & Queen County and Upper Mattaponi Indian Tribe
1.1.12	Upper Mattaponi Indian Tribe
1.1.13	Upper Mattaponi Indian Tribe
1.1.15	Upper Mattaponi Indian Tribe
1.1.18	King & Queen County and Upper Mattaponi Indian Tribe
1.1.19	Upper Mattaponi Indian Tribe
1.3.1	Rappahannock Tribe and Upper Mattaponi Indian Tribe
2.2.1	Rappahannock Tribe and Upper Mattaponi Indian Tribe
3.1.2	Rappahannock Tribe and Upper Mattaponi Indian Tribe
3.1.4	Rappahannock Tribe and Upper Mattaponi Indian Tribe
3.1.5	King & Queen County
3.1.6	Rappahannock Tribe and Upper Mattaponi Indian Tribe
3.1.7	King & Queen County and Upper Mattaponi Indian Tribe
3.1.8	Rappahannock Tribe
4.1.1	King & Queen County and Upper Mattaponi Indian Tribe

- Added a mitigation strategy that focuses on high hazards dams in Gloucester County.
- Added mitigation projects completed by the Rappahannock Tribe and the Upper Mattaponi Indian Tribe.

Section 9 – Implementation Plan

- Included how this plan will be integrated into locality plans, policies, codes and programs across disciplines and departments.
- Removed information on the Chesapeake Bay Nation Estuarine Research Reserve since this program was discontinued.
- Included information about how the Middle Peninsula Fight the Flood program to support educational efforts and flood proofing in the region.

Section 10 – Plan Adoption

- The dates that Board of Supervisors and Town Councils adopt the 2021 All Hazards Mitigation Plan will be updated.

Section 11 – Plan Maintenance

- Added information about how the region will handle annual updates and track progress on meeting mitigation strategies.

Section 3: Community Profile of Middle Peninsula Localities

The Middle Peninsula region encompasses six (6) counties and three (3) towns including Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex Counties as well as the Towns of Tappahannock, Urbanna, and West Point (Figure 1). Additionally, the region also includes three federally recognized tribes, including the Pamunkey, Upper Mattaponi, and Rappahannock Tribes. According to the 2020 Census, the total population of the Middle Peninsula is 90,826.

The Middle Peninsula is located on the western shore of the Chesapeake Bay, bound to the north by the Rappahannock River and to the south by the York River. As the region is located in the Virginia coastal plain, it has a relatively flat topography. The southeastern-most portions of the region are at sea level, while elevation rises to approximately 200 feet above sea level moving in a northwesterly direction.

Based on the region's low topography, 1200+ miles of coastline, and its proximity to waterways-broad rivers, meandering creeks, wide bays and tidal marshes, the Middle Peninsula is highly susceptible to floods and coastal storms. Additionally, with a high-water table in lower elevations of the Middle Peninsula, water cannot easily drain from land and thus exacerbates flooding from summer thunderstorms, hurricanes, nor'easters, as well as rising seas. Tidal surges associated with these severe storms often compound the flooding within this region.

While the Middle Peninsula region remains largely rural, it lies in close proximity to the metropolitan areas of Hampton Roads, Richmond and the Fredericksburg-Northern Virginia Metropolitan Areas. Suburban growth from these urban areas is spreading into the Middle Peninsula, affecting the region's natural resource-based industries and traditional rural lifestyle. For instance, the region's traditional land use patterns can best be described as having:

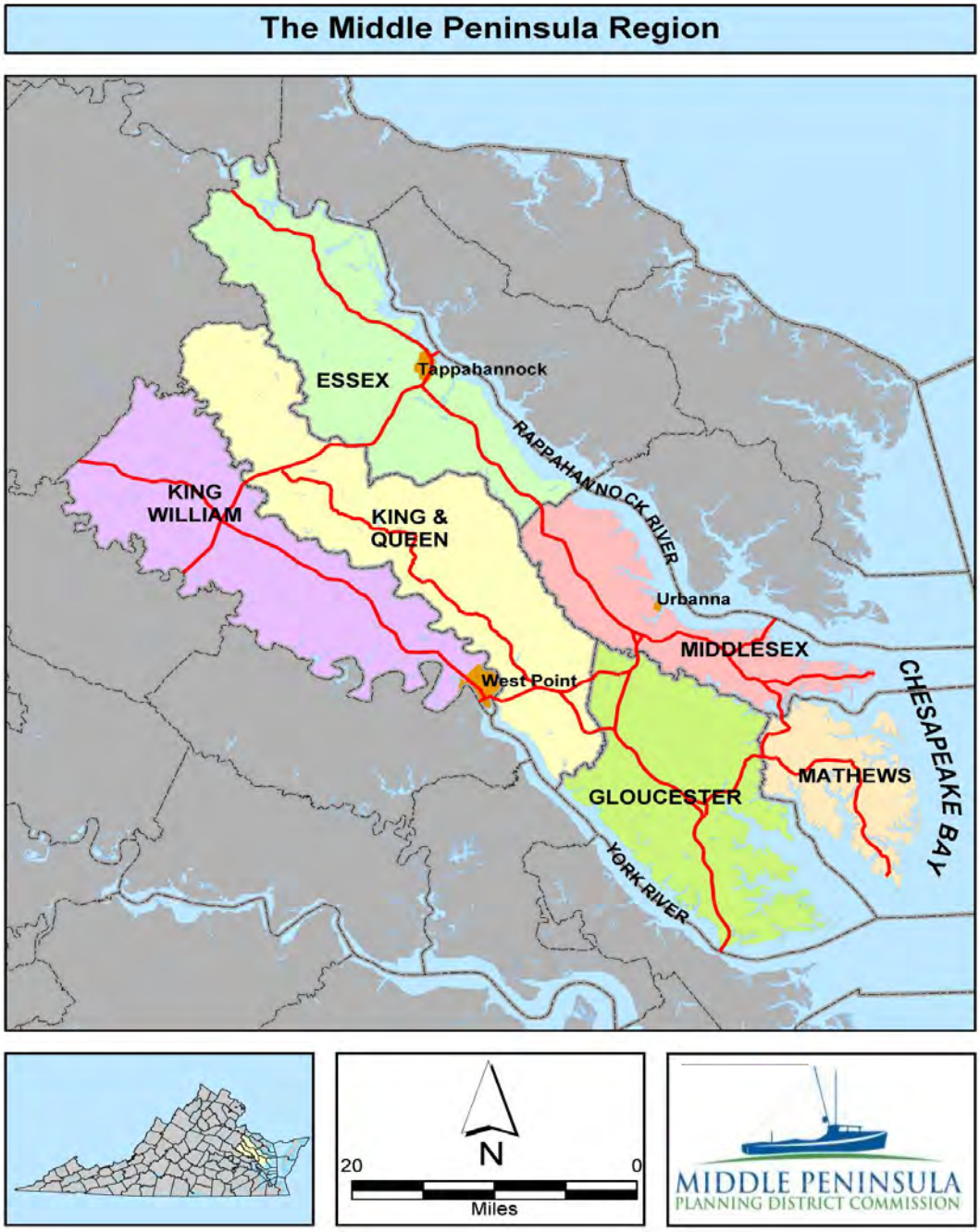
- A predominantly rural character with large, scattered farms and forested tracts;
- A number of closely-knit, small communities surrounded by working farms and forests;
- Small scale commercial fishing communities along the lower reaches of the watersheds;
- Three small towns that provide a focal point for commercial, industrial, and residential development at a modest scale; and
- Government operation centers that provide another focal point of local activity in the region.

However, the last 20 to 30 years, the region has seen a slight shift to:

- Growing sectors in tourism, retiree housing and related retiree services;
- Large, forested tracts are converting from woodlands to residential development;
- Waterfront communities transitioning from commercial fisheries with a reduced level of fisheries to an increasing number of marinas and residential developments; and
- Commercial development being located along Route 33 in Middlesex, Route 360 in King William, and Route 17 in southern Gloucester County between the Court House and the Coleman Bridge.

In summary, changes in land uses that concentrate development along the region's waterfront poses the greatest risk for hazard prevention and mitigation activities – particularly in the low-lying southeastern areas of Gloucester, Mathews, and Middlesex Counties.

Figure 1:



Essex County

Essex County is predominantly a rural county located at the northern end of the Middle Peninsula. It is bound on the north and east by the Rappahannock River, on the south by Middlesex County and on the west by Caroline and King and Queen Counties. The County comprises of approximately 286 square miles (Essex County Comprehensive Plan, 2015). Residential developments exist as small rural communities along the Rappahannock River or along the primary and many secondary roads. With a

history of slow/gradual growth and strong land use control regulations, the County has remained mostly rural.

According to the 2010 Census figures, the population in Essex consists of 11,151 people, an increase of 1,162 (11.63%) from the 2000 Census. The population has 5,274 men and 5,877 women and is comprised of 6,370 whites, 4,247 African Americans, and 534 people of other races. The population aged somewhat during the period from 2000 to 2010 with a modest reduction in school age population. These trends suggest that County programs may require redirection to meet the specific needs (i.e. health care, transportation, etc.) of an older population. A low to moderate trend in growth in the County's population is expected into the future.

Town of Tappahannock

Tappahannock is an incorporated town located along the shores of the Rappahannock River in the east-central portion of Essex County. The Town of Tappahannock is both the employment and population center of the County. Occupying less than three square miles of land, Tappahannock features an active waterfront, a historic downtown, residential subdivisions, schools, public buildings, an old airport and industrial center, a business corridor, and extensive wetland areas. Tappahannock serves as the county seat for Essex County.

According to the 2010 Census, the population in Tappahannock consists of 2,375 people, an increase of 307 (14.8%) from the 2000 Census. The population has 975 men and 1,400 women and is comprised of 1,076 whites, 1,128 African Americans, and 171 people of other races.

Gloucester County

Gloucester County's proximity to urban centers to the south, and the northwestward migration of suburban development from the greater Hampton Roads/Newport News area has transformed portions of the County into a suburban landscape. This is most pronounced at the southern reaches of the County from the Historic Court House Village and Gloucester Point. Residents from the Hampton Roads area and other areas of the urban crescent are lured to the County by the promise of lower taxes, lower housing costs, rural character, and relative freedom from the congestion evident in metropolitan areas. This has created increased traffic volumes on the limited collector roads not designed for such heavy use within the county. Commuters, travelers and trucks from the Middle Peninsula and points north use Route 17 as an alternative to interstate 64 to get to the Peninsula, Southside and the Outer Banks. Route 17 is the primary route through Gloucester and is also the heart of Gloucester's Development District where public water and sewer are available and where the county has expressed a desire to see continued economic development along this corridor. The need for alternative routes and connection to take local traffic off of Route 17 to reduce congestion is one of the goals expressed in the adopted Comprehensive Plan and the proposed update to the plan.

Despite the urban/suburban character of the County's Development District, the majority of the County remains relatively rural with low density development and active farm and timberlands. Much of the eastern portion of the County, east of Route 17 and South of Route 3/14 is characterized by low lying lands, low to moderate density housing and waterfront homes and communities. North of the Court House is very similar to other localities on the Middle Peninsula with a mixture of low and moderate density residential development and large tracts of farms and forests. Route 33, which runs along the northern portion of the County, provides convenient access from the interstate to upper Gloucester and Mathews County.

According to the 2010 Census, the population in Gloucester County consists of 36,858 people, an increase of 2,078 (5.97%) from the 2000 Census. The population has 18,239 men and 18,619 women, comprised of 32,149 whites, 3,197 African Americans, and 1,512 people of other races. A moderate trend in growth is expected into the future (Virginia Employment Commission, 2013).

King and Queen County

King and Queen County is located in the north-central portion of the Middle Peninsula and is bounded on the west by the York and Mattaponi Rivers which separate King and Queen from King William and New Kent Counties. The Dragon Swamp separates King and Queen County from Essex, Middlesex, and Gloucester Counties on the east. Often called the "shoestring county", King and Queen County is about 65 miles long and less than 10 miles wide. Farming and logging continue to be the mainstays to the local economy.

King and Queen County is the least populous county of the Middle Peninsula and one of the most rural counties in Virginia today. In 1990, the population density was only 20 people per square mile. Nearly three-fourths of the County's 318.1 square miles of land area is timberland. Over the past four decades, King and Queen County has experienced slow, but steady population growth. In 2010 the population density was 22 people per square mile.

According to 2010 Census figures, the population in King and Queen County consist of 6,945 people, an increase of 315 (4.8%) from the 2000 Census. The population has 3,454 men and 3,491 women and is comprised of 4,663 whites, 1,975 African Americans, and 307 people of other races. A moderate trend in population growth is expected into the future and the overall population distribution appears to be experiencing a gradual shift to the upper and lower ends of the County where transportation routes to jobs and retail markets are most favorable.

King William County

Located approximately 20 miles northeast of the City of Richmond, King William County is rapidly growing into a bedroom community of the metro-Richmond area. Much of the county's 286 square miles are made up of gently rolling farmland and scenic timberland located between the Pamunkey and Mattaponi Rivers. Farming and logging continue to be the mainstays of the local economy. King William is home to the only Native American Indian Reservations in the Commonwealth and to the oldest courthouse in continuous use in the United States. The Mattaponi and Pamunkey Tribes operate fish hatcheries on the rivers. Residents and visitors enjoy the numerous recreational opportunities that the rivers provide.

According to 2010 Census figures, the population in King William County consists of 15,935 people, an increase of 2,789 (21.2%) from the 2000 Census. The population has 7,759 men and 8,176 women and is comprised of 12,297 whites, 2,819 African Americans, and 819 people of other races. Projections indicate that King William County will continue to experience moderate to accelerated population growth. By the year 2020, it is estimated that the County's population will grow at a rate of 8.62%, increasing the population by 1,373 persons. Growth management will become more important as competing uses vie for space and facilities.

Town of West Point

The Town of West Point lies at the extreme southern end of King William County where the Mattaponi and Pamunkey Rivers join to form the York River. The town is relatively flat, with large sections comprised of tidal marshes, particularly along the Mattaponi River. The highest elevations occur at the northern end of town at a height of 30+ feet above sea level. Most of the Pamunkey River waterfront is

on a bluff averaging 20 feet in height. Union forces destroyed the town and the railroad, completed in 1859, during the Civil War. Only four houses survived the torching and remain intact today. West Point became an incorporated town in 1870. During the late 19th and early 20th centuries, West Point was a popular tourist destination. After the decline of tourism, a shipyard, built in 1917, and a pulp mill, built in 1918, revitalized the town.

The river areas surrounding the town are primarily used for recreation and barge access to the WestRock, a Meadwestvaco and Rock Tenn Corporation, where pulping operations convert wood chips, sawdust and recyclable paper products into pulp for use in producing various types of paperboard. The Old Dominion Grain Corporation also benefits from barge access.

According to 2010 Census figures, the population in Town of West Point consists of 3,306 people, an increase of 400 (15.4%) from the 2000 Census. The population has 1543 men and 1763 women and is comprised of 2618 whites, 509 African Americans, and 179 people of other races.

Mathews County

Mathews County is located at the eastern tip of the Middle Peninsula. The County is bordered mostly by water, with the Chesapeake Bay to the east, the Mobjack Bay to the south, the North River to the west, and the Piankatank River to the north. Except for approximately five miles that border Gloucester County, the County's perimeter is formed by its 217-mile shoreline. Mathews is predominantly a rural community that has attracted an increasing number of retirees and vacationers. More than half of the working residents earn their living outside the County. The mainstays of the local economy are agriculture, trade, seafood, and tourism.

Much of the housing in Mathews is traditional single-family dwellings, but the County also has a growing number of manufactured homes and vacant seasonal housing (built typically for summer occupancy). Seasonal housing, in the form of cottages, recreational vehicles, rental mobile homes, and a few condominium units increased in number from 448 in 1970, to 583 in 1980, to 783 in 1990. Residents of seasonal housing are often not accounted for in the census counts because the units were not occupied during the census survey. It is estimated that only about 75% of the housing units in Mathews County are occupied year-round, adding significantly to the summer population of Mathews County.

According to 2010 Census figures, the population in Mathews County consists of 8,978 people, a decrease of 229 (-2.5%) from the 2000 census. The population has 4,363 men and 4,615 women and is comprised of 7,898 whites, 823 African Americans, and 257 people of other races. Projections indicate that Mathews County will continue to experience low population growth. By the year 2020, it is estimated that the County's population will grow at a rate of 3.41%, increasing the population by 9,284 persons. Mathews County's population changed little between 1840 and 1900. The population peaked in 1910 with 8,922 residents, but gradually declined over the next five decades to a low point of 7,121 in 1960. This was in keeping with a national trend of population shifts from rural to urban areas because of the increased job opportunities in the cities. The population began to grow in the 1970's and it took until the mid-1990's before the population reached the peak reported in 1910.

Middlesex County

Middlesex County, located at the eastern end of the Middle Peninsula, is comprised of 131 square miles of land and 135 linear miles of shoreline. The County is surrounded by three significant waterways; the Rappahannock River to the northeast, the Piankatank River to the southwest, the Chesapeake Bay to the east. The County is also bordered by Gloucester County to the southeast, King and Queen County to the West, and Essex County to the north. The geographic location of Middlesex County, particularly

with the close proximity to two significant rivers, the Chesapeake Bay and the Atlantic Ocean, make Middlesex County communities much more vulnerable to tropical weather events, affecting the eastern seaboard of the United States. The county government operations are managed by a County Administrator, who is appointed by a five-person elected Board of Supervisors. The Government Seat, Board of Supervisors Meeting Room, and Courts Complex, are located in the area known as Saluda, Virginia. The Middlesex County School System is comprised of an elementary, middle and high school, with the School Board Administration Offices located in the Cooks Corner Office Building, just east of Saluda.

Middlesex has remained largely rural over the years, with farming, forestry, and fin and shell fishing providing the principal elements of the economic base. The County's relatively remote geographical location adds to the community's rural character. The 2013 Census reports the county population to be 10,762 full-time residents, a decrease of 197 (2%), from the 2010 census of 10,959. The population is made up by 5,413 females, and 5,349 males, comprised of 8,545 Whites, 1,937 African Americans, and 280 people of other races. A total of 3,056 residents, or 28.4% of the population of Middlesex, are over 65 years-of-age. With the population dropping 2% in the past three years, it is estimated that the county's population will not see any drastic fluctuations, up or down, throughout the next decade.

The county population lives in 7,184 dwellings, with only 3.5% of the occupancies being comprised of multi-family dwelling units, a figure significantly lower than the Commonwealth's average of 21.7%. County officials estimate that 30% of the housing units in the community are seasonal, increasing the population between May and October with an additional 20,000 residents. Middlesex, Virginia, is home to one of the top boating populations in the Commonwealth of Virginia, another factor which adds to the seasonal population of the county.

Public Safety Services in Middlesex County are provided by the Office of the Sheriff, four individual volunteer fire companies, Deltaville, Hartfield, Urbanna, and Waterview; two volunteer rescue squads, Deltaville and Urbanna. The collective departments work together responding to law enforcement situations, fires, medical emergencies, and all-hazards incidents throughout the community. All Emergency Management activities, including operations of the Emergency Operations Center as well as maintenance and oversight of the Emergency Operations Plan, are managed by a county appointed Emergency Services Coordinator. This individual works in conjunction with the Middlesex Emergency Management Director, who is an appointed member, from the Board of Supervisors. The Emergency Services Coordinator also works in conjunction with the leadership and members of the volunteer fire departments and volunteer rescue squads.

Town of Urbanna

The Town of Urbanna is located in Middlesex County on the Rappahannock River on a finger of land bounded by Perkins Creek and Urbanna Creek. The Town is one of America's original harbor towns and is located approximately five miles from Saluda, VA. Incorporated in 1902, the present town boundary comprises an area of about one-half square mile. The town operates an active boat harbor which is a major gateway for the fishing and recreational boating industries serving the area.

According to 2010 Census figures, the population in the Town of Urbanna consists of 476 people, a decrease of 67 (-12.3%) from the 2000 Census. The population has 204 men and 272 women and is comprised of 431 whites, 35 African Americans, and 10 people of other races. The Town of Urbanna experiences a seasonal swelling of the population to well above 2,000 people within the town and at the nearby Bethpage Campground due to seasonal use of vacation homes and campsites. This influx of tourists brings in much needed revenue and helps support the service industry and the tax base for the county. Also, the Town is the location of an annual Urbanna Oyster Festal. Since 1958, this event

features oyster specialties and other Chesapeake Bay seafood, a parade, a fine arts exhibit and visiting tall ships. Crowds for the two-day event reach approximately 75,000 people.

Rappahannock Tribe

The Rappahannock Tribe, located on the river of the same name, is one of seven Federally recognized tribes in Virginia. Their ancestors were among those greeting the first English colonists to Virginia in the early 17th century. It was not long, however, before the English settlers dispossessed and displaced the Rappahannock River groups from the rich lands along the river. Acknowledging their treaty obligations to the Rappahannock, in 1682, colonial authorities assigned approximately 3,500 acres to the Rappahannock Indians in the vicinity of Indian Neck, interior land miles from their ancestral home. Rappahannock families nonetheless persisted in this vicinity through the 18th and 19th centuries and many tribal members remain in Indian Neck today, where the Rappahannock Indian Tribal Center is located and where the Tribal Government operates.

The Rappahannock's are organized in four components of community:

- Children (birth to 10 years) are the first link in the chain of tribal growth and are taught dance, drum, history, language, political structure, and traditions; elders spend much time educating and preparing children for the next stage of life.
- Youth (ages 11 to 18) are taught more complicated concepts of indigenous construction, creative arts, tool making, gathering skills, farming techniques, and hunting skills. Producers spend time training and mentoring youth in preparation for their next stage of life.
- Producers (ages 19 to 59) are the managers of programs, committees, and projects. They usually hold positions as official or unofficial leaders and are mentored by Elders. Classroom education programs train them in project planning, design, and implementation, as well as leadership for council and committee members.
- Elders (60+) have lived through all the previous stages of life and are well endowed with spiritual wisdom and cultural knowledge. They are the Keepers of the Knowledge and hold closely to oral tradition and intimate history of previous generations. They are responsible for sharing their knowledge with children and youth and act as guides to the producers, collaborating jointly in the decision-making process.

Health and wellness in tribal culture is closely tied to spiritual, cultural, and social traditions. Through the generations, tribal traditions have incorporated all the dimensions of wellness (spiritual, social, emotional, physical, occupational, environmental, financial, and intellectual). It is this holistic view that continues to guide the work of Rappahannock leaders today.

The Rappahannock Tribe gained State Recognition in 1983 and Federal Recognition in 2018. Tribal members total more than 350 and reside primarily on rural properties located on the Middle Peninsula in Virginia. The Rappahannock Tribe's Service Area (RTSA) includes King & Queen, King William, Essex and Caroline Counties in Virginia. The Tribe is led by Chief Anne Richardson and its offices are located at 5036 Indian Neck Road, Virginia 23148.

Upper Mattaponi Tribe

The Upper Mattaponi Indian Tribe (UMIT) is a federally recognized Indian tribe centered in King William County, Virginia. The Tribe was officially recognized by the Commonwealth of Virginia on March 25, 1985, and received federal recognition on January 29, 2018.

As part of the Powhatan Chiefdom, the Tribe's ancestral lands of Tsenacomacah encompassed the Tidewater and Eastern Shore regions of Virginia. The Tribe were signatories to the Middle Plantation Treaty of 1677 as a tributary tribe, subject to the Queen of the Pamunkey.

The inland waterways of the York River watershed, surround the Tribe's current tribal center, with the Tribal Government operating in King William County. The governing body of the Tribe consists of the Chief, Assistant Chief, and five (5) Council Members. Under the Tribe's Constitution, the Upper Mattaponi Indian Tribal Council has the power and authority to represent and speak for the Upper Mattaponi Indian Tribe in all matters for the welfare of the Tribe. The Tribal Council also has the power and authority to negotiate with federal, state, and local governments, as well as the councils or governments of other tribes. The Tribe has over 650 tribal citizens that reside primarily in the York, James, and Rappahannock River watershed.

Economic Resiliency

In 2020, the MPPDC updated and approved the Middle Peninsula Comprehensive Economic Development Strategy (CEDS) that sets forth goals and objects necessary to improve the regional economy. In part, a chapter was added to this document titled, "Coastal Economic Resiliency" to focus on emerging challenges posed by climate change and rising sea levels. The MPPDC intends to expand this chapter to include specific economic challenges associated with managing coastal resiliency as well as new program and services instructions to address coastal risk, such as the MPPDC Fight the Flood Program (https://fightthefloodva.com/)which provides citizens access to loans, grants, and insurance to protect private investments (i.e. homes and land). As hazards pose threats to the local and regional economy, economic resiliency of the region is critical to the regions long term success. The three primary attributes of economic resiliency include: the ability to recover quickly from a shock, the ability to withstand a shock, and the ability to avoid the shock altogether.

Based on mapping efforts by the U.S. Bureau of Labor Statistics (BLS) in 2019, maps of Employment in Hurricane Storm Surge Flood Zones were developed that provide an example of impacts to employment in hurricane storm surge flood zones in Gloucester, Mathews, and Middlesex Counties (Figures 2-4). These maps show that in Mathew County 62.8% of all business establishments would be impacted by hurricane storm surge and reduced quarterly revenues in the third quarter of 2019 by 76.5%. In Middlesex County 7.6% of all business establishments would be impacted by hurricane storm surge and reduced quarterly revenues in the third quarter of 2019 by 6.5%. In Gloucester County 15.2% of all business establishments would be impacted by hurricane storm surge and reduced quarterly revenues in the third quarter of 2019 by 8.9%. Consequently, this will have economic consequences to the overall region.

Figure 2: Employment in Hurricane Storm Surge Flood Zones in Mathews County (BLS, 2019).

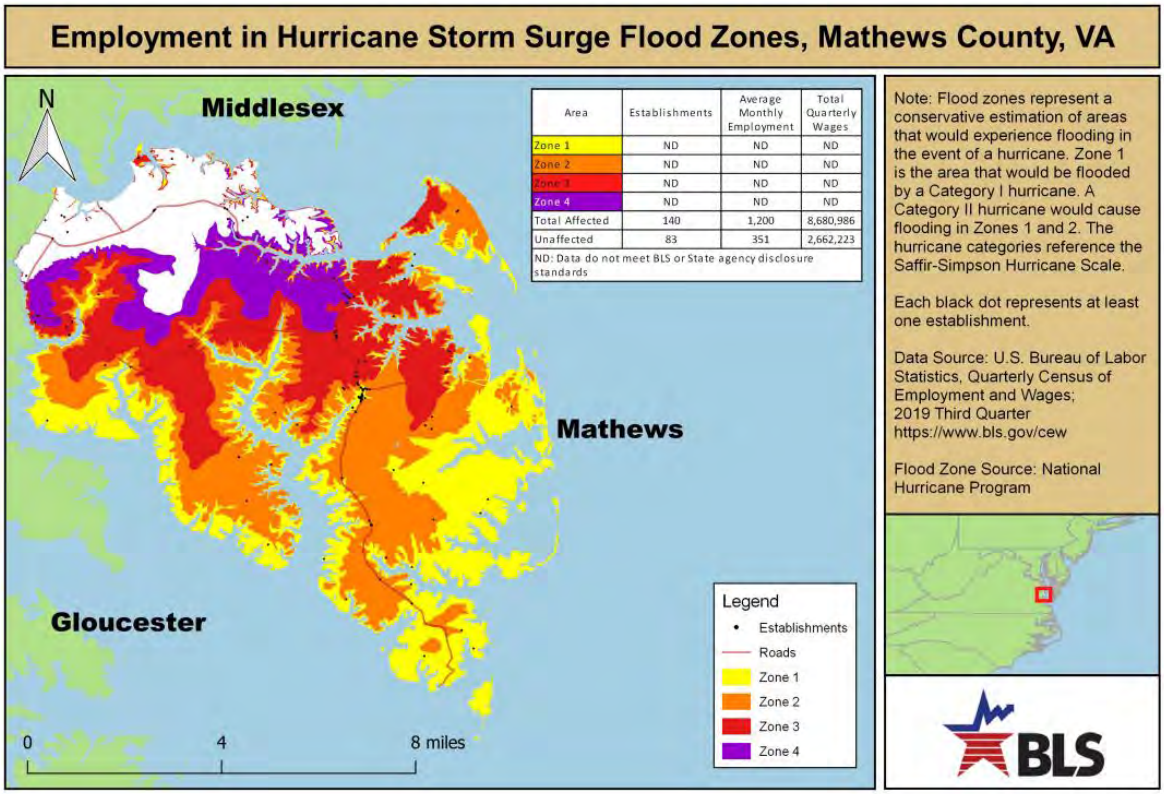


Figure 3: Employment in Hurricane Storm Surge Flood Zones in Middlesex County (BLS, 2019).

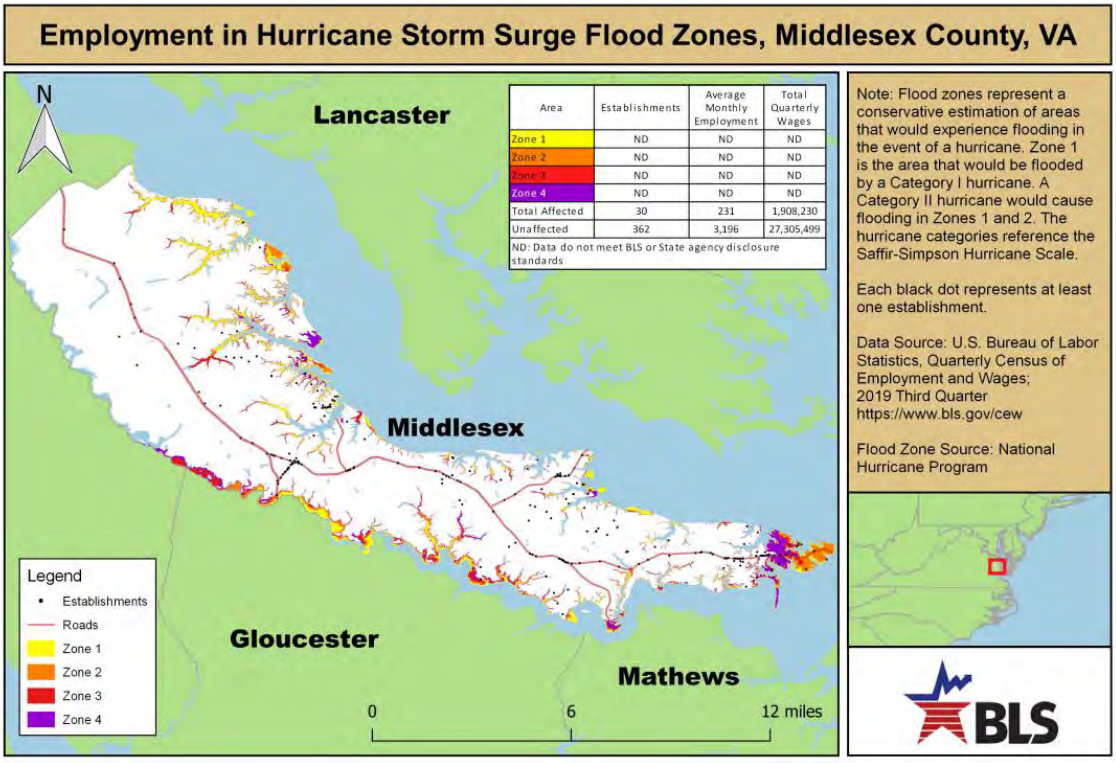
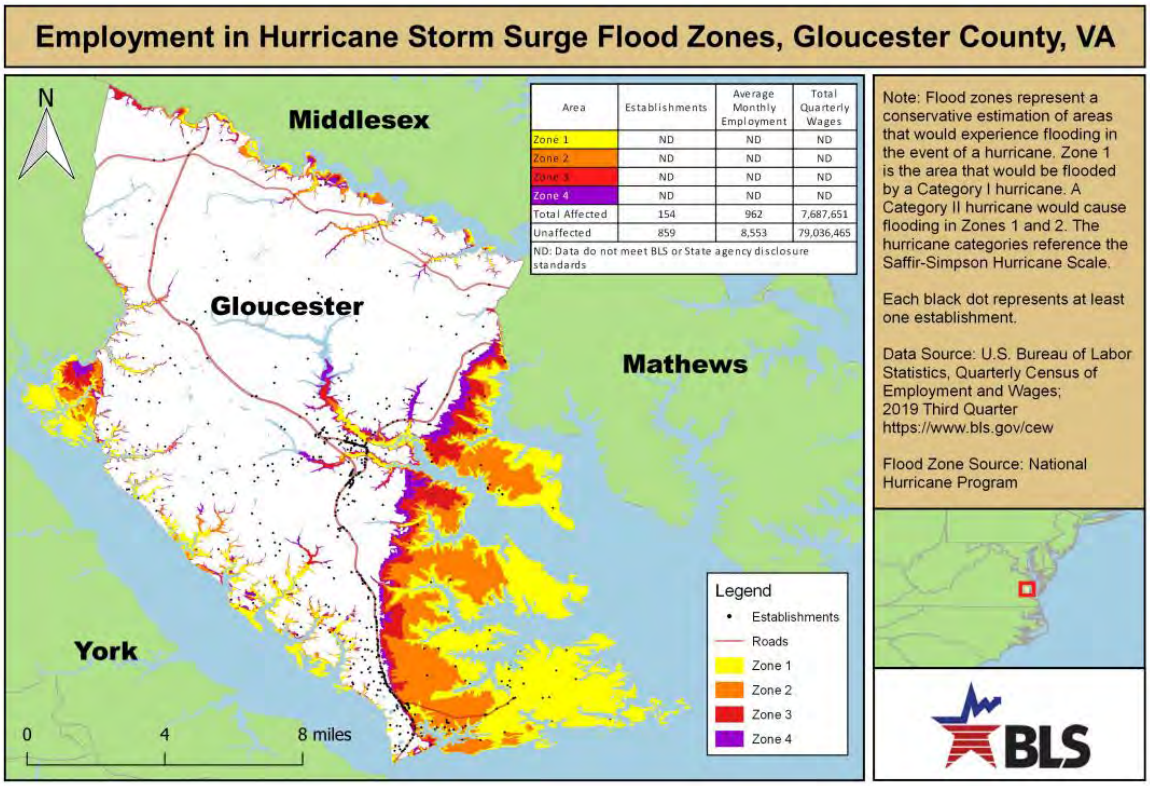


Figure 4: Employment in Hurricane Storm Surge Flood Zones in Gloucester County (BLS, 2019).



Therefore, to minimize impacts, not only from hurricane storm surge, but from all other hazards identified in this plan, local business leaders should anticipate, prepare, and plan for impacts and consider how to recover if such events occur.

Section 4 – Hazard Identification and Risk Assessment

MPPDC staff engaged community partners and the general public concerning the nature of hazards that threaten the Middle Peninsula region. A Local Planning Team (LPT) was created to provide local insight and expertise. The LPT identified hazards of the Middle Peninsula, how they should be prioritized as critical, moderately-critical and non-critical hazards, and they also decided that an in-depth analysis was needed for critical hazards. Non- Critical and moderately hazards were not re-analyzed with the exception of recent occurrences due to their minimal impact.

Based on the Federal Guidelines [Disaster Mitigation Act of 2000, *§201.1(b)]*, the Hazards Identification and Risk Assessment (HIRA) is only focused on natural hazards and their impacts. It measures potential loss of life, personal injury, economic impairment, and property damage resulting from natural hazards that threaten the Middle Peninsula. The Middle Peninsula HIRA involved:

1. Hazard Identification,
2. Risk Assessment Analysis, and
3. Financial Loss Estimations (See Section 5).

4.1 Hazard Identification

The LPT first reviewed and evaluated the 2016 list of hazards impacting the Middle Peninsula. MPPDC staff developed a hazards survey for localities and tribes' representatives on the LPT to assess the hazards risk the highest and lowest risk to Middle Peninsula communities. Based on survey results the LPT decided to remove tsunamis, landslides, and volcanoes from the hazards list. These were deemed to have little to no risk to the region. Next, the LPT decided to combine similar hazards under general heading including:

- Consolidated Winter Storm (ice) and Winter Storm (snow) to WINTER WEATHER
- Consolidated Coastal, Riverine, and ditch flooding hazards to FLOODING
- Consolidated Extreme cold and extreme heat to EXTREME TEMPERATURES

Additionally, instead of just focusing on natural hazards the LPT decided to be inclusive of all hazards that may threaten the Middle Peninsula region.

Table 2: List of Hazards. The LPT identified the following as hazards that may impact the region.

• Hurricanes • Winter Weather (Ice & Snow) • Tornadoes • Flooding (Coastal Flooding/Nor-easters, riverine flooding, and ditch flooding) • Coastal/Shoreline Erosion • Sea Level Rise (added in 2010) • Wildfires • High Winds/Windstorms • Dam Failure	• Droughts • Lightning • Earthquakes • Shrink-swell Soils • Extreme Temperatures (Cold & Heat) • Land Subsidence/Karst • Air Quality • HAZMAT • Summer Storms • **Communicable Diseases (added in 2021)**

Based on discussions held by the LPT, one new hazard was added to the list that caused new concern to the region.

Communicable Diseases - According to the Commonwealth of Virginia Hazards Mitigation Plan (2018), *A communicable disease is an illness caused by an infectious agent or its toxic products that develops*

when the agent or its product is transmitted from an infected person, animal, or arthropod to a susceptible host. Infectious agents include viruses, bacteria, fungi, parasites, or aberrant proteins called prions. The infectious agent might spread by one of several mechanisms, including contact with the infected individual or his or her body fluids, contact with contaminated items or a vector, or contact with droplets or aerosols. An infection, which is the actual spread of the infectious agent or its toxic product, is not synonymous with disease because an infection may not lead to the development of clinical signs or symptoms.

In conjunction with the list of hazards, the LPT reviewed the 2016 prioritization (Table 3) of hazards as a result of utilizing the Hazards Vulnerability Tool worksheet provided by VDEM staff (originally designed to estimate medical center hazard and vulnerability by Kaiser Permanente).

Table 3: Prioritization Worksheet for Hazards on the Middle Peninsula in 2016 AHMP.

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET
Priority Worksheet for Hazards

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 - 100%	
Winter Storms (Ice)	3	3	2	2	2	75%	1
Coastal Flooding	3	2	3	2	2	75%	1
Lightning	3	2	2	2	1	58%	2
Hurricanes	2	2	3	2	2	50%	3
Summer Storms	3	2	2	1	1	50%	3
Tornados	2	2	2	2	2	44%	4
Winter Storm (Snow)	2	2	2	2	2	44%	4
Coastal/Shoreline Erosion	2	2	2	1	2	39%	5
Wildfire	2	2	2	1	2	39%	5
Riverine Flooding	2	2	2	1	2	39%	5
Sea Level Rise	2	1	2	1	2	33%	6
High Wind/Windstorms	2	2	2	1	1	33%	6
HAZMAT	2	2	2	1	1	33%	6
Ditch Flooding	2	1	2	1	2	33%	6
Drought	2	1	2	1	1	28%	7
Extreme Cold	2	2	1	1	1	28%	7
Extreme Heat	2	2	1	1	1	28%	7
Dam Failure	1	1	1	1	1	11%	8
Earthquake	1	1	1	1	1	11%	8
Air Quality	1	1	1	1	1	11%	8
Shrink-Swell Soils	1	0	1	0	1	6%	9
Landslides	1	1	1	0	0	6%	9
Land Subsidence/Karst	1	0	0	0	0	0%	10
Tsunami	0	0	0	0	0	0%	10
Volcano	0	0	0	0	0	0%	10
AVERAGE	1.64	1.32	1.48	0.96	1.16	28%	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT	
0.28	0.65	0.43

Spreadsheet developed by:
KAISER PERMANENTE

Like the 2006, 2010, and 2016 updates, the LPT agreed to continue using the Kaiser Permanente Hazard Vulnerability Assessment Tool for this AHMP update. In doing so, this provided a measure of continuity and consistency between the mitigation plans. Therefore, each county, town, and Tribe LPT representative were asked to complete the vulnerably worksheet and turn it into the MPPDC Planner. The LPT representative for each community evaluated each hazard based on five criteria to rank the hazards from highest to lowest priorities. The five categories included the probability based on past events, the potential impacts to structures, primary impacts (percentage of damage to a typical structure or industry in the

community), secondary impacts (based on impacts to the community at large), and potential mitigation options. The definitions given in Table 4 were used as a standard for evaluation of all the hazards.

Table 4: Prioritization Criteria for Hazards on the Middle Peninsula.
Probability - *Frequency of occurrence based on historical data of all potential hazards*
Level 0 Not Applicable 1 Unlikely (less than 1% occurrence: no events in the last 100 years) 2 Likely (between 1% and 10% occurrence: 1-10 events in last 100 years) 3 Highly Likely (over 10% occurrence: 11 events or more in last 100 years)
Affected Structures - *Number of Structures affected*
Level 0 Not Applicable 1 Small (limited to 1 building) 2 Medium (limited to 2-10 buildings) 3 Large (over 10 buildings)
Primary Impacts - *Based on percentage of damage to a typical structure or industry in the community*
Level 0 Not Applicable 1 Negligible (less than 3% damage) 2 Limited (between 3% and 49% damage) 3 Critical (more than 49% damage)
Secondary Impacts - *Based on impacts to the community at large*
Level 0 Not Applicable 1 Negligible (no loss of function, no displacement time, no evacuations) 2 Limited (some loss of function, displacement time, some evacuations) 3 Critical (major loss of loss of function, displacement time, major evacuations)
Mitigation Options - *Number of cost-effective mitigation options*
Level 0 Not Applicable 1 Many (over 3 cost effective mitigation options) 2 Several (2-3 cost effective mitigation options) 3 Few (1 cost effective mitigation option)

After much consideration of the criteria, and consideration of readily available data, local knowledge, and observations the LPT re-ranked the hazards for this update. Table 5 provides the new regional ranking of the hazards. This ranking was the average ranking from each of the localities and tribes. Please see Appendix F for the individual hazard rankings.

Table 5: Prioritization worksheet for Hazards in the Middle Peninsula for the 2021 update.

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL

NATURAL HAZARDS -- SUMMARY SHEET

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 = N/A 1 = Low 2 = Moderate 3 = High	0 - 100%	
Winter Storms (Ice & Snow)	2	2	2	2	2	46.08%	2
Flooding (ie. coastal, riverine, ditch & stormwater)	2	2	2	2	1	40.45%	5
Lightning	2	1	1	1	1	34.57%	7
Hurricanes	2	2	2	2	2	45.54%	3
Summer Storms	3	2	2	1	2	51.32%	1
Tornados	2	2	2	2	2	37.92%	6
Coastal/Shoreline Erosion	2	1	1	1	1	26.20%	9
Wildfire	2	1	1	1	1	20.67%	10
Sea Level Rise	1	1	1	1	1	18.20%	13
High Wind/Windstorms	2	2	2	1	1	28.34%	8
HAZMAT	1	2	1	1	1	20.44%	11
Drought	2	1	1	1	1	17.54%	14
Dam Failure	1	1	1	0	1	6.02%	18
Extreme Temperatures (Cold & Heat)	2	1	1	1	1	20.19%	12
Earthquake	1	1	1	1	1	10.81%	16
Air Quality	1	1	1	1	1	7.71%	17
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	12.34%	15
Land Subsidence/Karst	1	1	1	0	1	3.95%	19
Communicable Diseases	2	2	1	2	2	44.90%	4
AVERAGE	1.65	1.32	1.38	1.25	1.27		

**Threat increases with percentage.*

UNMITIGATED RISK=		PROBABILITY * IMPACT
	0.04	0.08

As an outcome of the reassessment and re-ranking of hazards, there were five hazards ranked as having the highest relative risk and thus considered **"Critical Hazards".** The Critical hazards include:

1. Summer Storms,
2. Winter Weather (ice & snow),
3. Hurricanes,
4. Communicable Disease, and
5. Flooding (riverine, coastal, stormwater, and ditch).

The hazards considered **"Moderately Critical"** have historically occurred in the Middle Peninsula yet ranked lower than the Critical Hazards in terms of risk during the hazard prioritization exercise. The Moderately-Critical hazards include:

6. Tornadoes,
7. Lightning,
8. High Wind/Windstorms
9. Coastal/shoreline Erosion,
10. Wildfires,
11. HAZMAT, and
12. Extreme Temperatures.

Hazards considered **"Non-Critical"** have occurred very infrequently or have not occurred at all – based on the available historical records. These hazards are not considered a widespread threat that would result in significant loss of property and life in the Middle Peninsula. The Non-Critical hazards include:

13. Sea Level Rise,
14. Drought,
15. Shrink- Swell Soils,
16. Earthquake,
17. Air Quality,
18. Dam Failure, and
19. Land Subsidence/Karst.

Public Survey

As part of the All-Hazards Mitigation Plan update, public outreach and input was gathered through a public survey. A survey was released on March 1, 2021, to request information on local hazards and risks and thoughts on mitigation actions. Mitigation actions were defined as any action taken to reduce or eliminate the long-term risk to human life and property from hazards. The survey was open for 2 weeks and closed on March 15, 2021. This is a summary of the public survey responses.

Over the course of a 2-week period there were 106 respondents to the survey. Forty-one (38.68%) of respondents were from Gloucester County, eighteen (16.98%) from King & Queen County, fourteen (13.21%) from Middlesex County, twelve (11.32%) from Mathews County, ten (9.43%) from the Town of West Point, eight (7.55%) from King William County, three (2.83%) from Essex County, and zero participants from Town of Urbanna and the Town of Tappahannock. Of the 106 respondents zero respondents were affiliated with a federally recognized tribe (i.e. Upper Mattaponi, Rappahannock, and Pamunkey Tribe) within the region.

When asked how concerned they were about the hazards affecting their community over the next 20 years respondents were most concerned about FLOODING, HURRICANES, TORNADOES, and COMMUNICABLE DISEASE. The hazards they were least concerned about DAM FAILURE, EARTHQUAKES, SHRINK-SWELL SOILS, and WILDFIRES. The top three hazards that threaten the region include HURRICANES, FLOODING, and WINTER STORMS.

Middle Peninsula localities and its citizens can be impacted by hazards. While living in the Middle Peninsula region of 76.42% of respondents have experienced or have been impacted by a hazard listed within the AHMP and 23.58% have not been impacted. During rain events 32.08% of respondents mentioned that their road floods. Of the respondents 21 (19.81%) have homes within a floodplain, 70 (66.04%) are not located in a floodplain, and 15 (14.15%) did not know. Additionally, when asked if they had flood insurance, 24 (22.64%) said yes, 75 (70.75%) said no, and 6 (6.60%) did not know.

The LPT considered this information when ranking their hazards within their jurisdiction. Also based off the survey the hazards of most concern were listed as critical hazards for the region.

4.2. Hazards Considered "Non-Critical" Hazards to the Middle Peninsula

The following section describes hazards that were deemed "Non-Critical" hazards to the Middle Peninsula region by the LPT.

4.2.1. Sea Level Rise

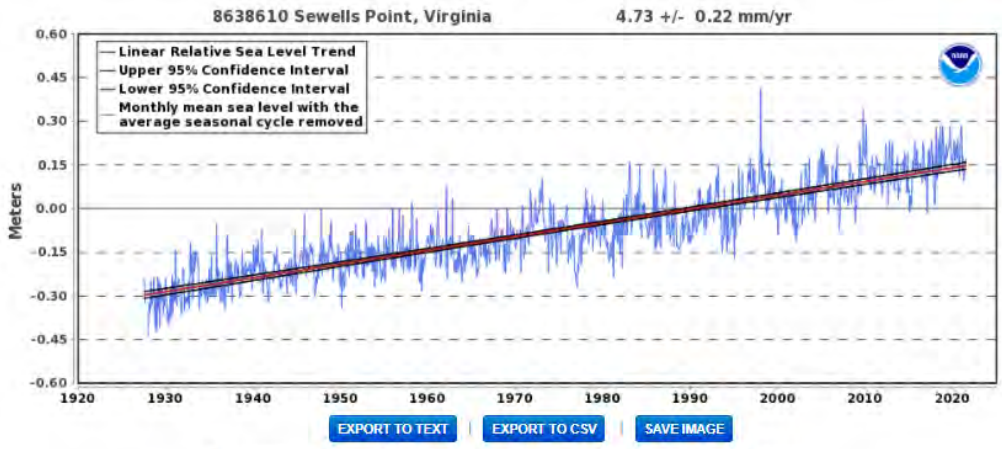
A look at the geologic record of Chesapeake Bay shows a long and dynamic history - from the bolide (asteroid or comet) impact about 35 million years ago which formed the Chesapeake Bay impact crater, to the melting of glaciers beginning about 18,000 years ago, resulting in a continued rise of sea level, and drowning of the Susquehanna River valley. Given that the rise in sea level has been occurring for thousands of years and is fundamental to the present formation of the Chesapeake Bay and the region's local tidal waters, there has been a heightened level of concern in recent years about sea level rise. Concern is justified given that current and projected rates of sea level rise and what has been experienced during the last century. There is consensus that rise in sea level will continue for centuries to come, and that human and natural communities within the Middle Peninsula will be vulnerable.

Causes and Current Rates of Local Sea Level Rise

Processes responsible for rising sea levels are complex. To help simplify the matter, it is useful to make a distinction between the concepts of eustatic and relative sea level (RSL) change. Eustatic change, which can vary over large spatial scales, describes sea level changes at the oceanic to global scale that result from changes in the volume of seawater or the ocean basins themselves. The two major processes responsible for eustatic change are the thermal expansion of seawater due to warming and the melting and discharge of continental ice (i.e., glaciers and ice sheets) into the oceans. The global average for current (2006-2015) eustatic sea level change is 0.14 in/yr (3.6 mm/yr) (NOAA Laboratory for Satellite Altimetry, 2021) with estimates for the Chesapeake Bay region on the order of 0.07 in/yr (1.8 mm/yr; Boon et al. 2010) for the approximate same time period. According to the NOAA tide gauge at Sewell's Point, Virginia there is relative sea level rise trend of 4.73 millimeters/year. Figure 5 shows trend data from 1927 to 2020.

Figure 5:

Relative Sea Level Trend
8638610 Sewells Point, Virginia



The relative sea level trend is 4.73 millimeters/year with a 95% confidence interval of +/- 0.22 mm/yr based on monthly mean sea level data from 1927 to 2020 which is equivalent to a change of 1.55 feet in 100 years.

The plot shows the monthly mean sea level without the regular seasonal fluctuations due to coastal ocean temperatures, salinities, winds, atmospheric pressures, and ocean currents. The long-term linear trend is also shown, including its 95% confidence interval. The plotted values are relative to the most recent Mean Sea Level datum established by CO-OPS. The calculated trends for all stations are available as a table in millimeters/year and in feet/century (0.3 meters = 1 foot). If present, solid vertical lines indicate times of any major earthquakes in the vicinity of the station and dashed vertical lines bracket any periods of questionable data or datum shift.

RSL change describes the observed change in water level at a particular location and represents the sum of eustatic sea level change and local vertical land movement (subsidence or uplift) at that location. Within the Chesapeake Bay region, land subsidence represents a significant component of RSL change. Factors contributing to land subsidence include tectonic (movement of the earth's crust) and man-induced impacts (e.g., groundwater withdrawal, hydrocarbon removal). Such land subsidence at rates of **1.1 to 4.8 millimeters per year** exacerbate sea level rise within the region (USGS, 2013).

It is important to note that the lower lying counties like Gloucester and Mathews County will most likely see the largest impact from sea level rise due to their proximity to water and their low-lying geography. Please Section 5 for the Hazus assessment on sea level rise and estimated losses.

Sea Level Rise Vulnerability

Coastal habitat and activity may be impacted by sea level rise. As the water reaches further inland it will influence humans, the environment, and the economy. Table 6 shows the potential impacts to sea level rise.

Table 6: Impacts of sea level rise on humans, the environment, and the economy.

Sector	Effect
IMPACTS TO HUMANS	
Recreation	-Public access point throughout the region may be inundated
Transportation	-Roads may be inundated -Travel disruptions
Infrastructure	-Property loss and increased need to mitigate -Increased demands on stormwater management systems -Inundation of public and private infrastructure
Health	-Sanitation concerns will increase as rising groundwater levels and sea waters may inundate onsite wastewater disposal systems and drain fields.
Emergency Response	-The ability to provide emergency services to all inundated areas may be reduced. There may be difficulty reaching these locations due to high waters.
IMPACTS TO THE ENVIRONMENT	
Hydrology and Water resources	-Water quality could be impacted as rising groundwater levels and sea waters may inundate onsite wastewater disposal systems and drain fields. -Changes in hydrology could impact local natural resources.
Agricultural crops	-Increased inundation of crop fields. This could drown the crops. -Salt water intrusion could destroy crops.
Forests	-Salt water intrusion could destroy forests creating "ghost forests".
IMPACT TO THE ECONOMY	
Transportation	-Inundated roads may cause travel and commerce disruptions -Increase road maintenance and cost
Business	-Reduced interest in the region to locate business -Higher insurance rates -Impacts to business infrastructure
Agriculture	-As the region's economy is based on natural resources, saltwater intrusion could damage silviculture stands and crops that will have a negative impact on the local and regional economy.

Sea Level Rise Extent (Impact)

RSL rise rates at the local level are derived from accurate time series of water level measurements spanning several decades or more. A recent analysis of tide gauge data by the Virginia Institute of Marine Science reported relative sea level rise 0.19 in/yr (4.73 mm/yr). Although there are no additional adequate tidal

records available for the Middle Peninsula's bordering rivers (i.e. York and Rappahannock Rivers), one would expect RSL rise rates to increase as one approached areas of elevated land subsidence such as West Point, VA. Based on land subsidence and eustatic sea level information, the RSL rise rate would be expected to be on the order of 0.22 in/yr (5.6 mm/yr) at or near West Point, VA. There is growing concern that RSL rise rates will accelerate in the future with projections of sea level increases in the Bay region.

4.2.2. Drought

Empirical studies conducted over the past century have shown that drought is never the result of a single cause. It is the result of many causes, often synergistic in nature, and therefore often difficult to predict more than a month or more in advance. In fact, an area may already be in a drought before drought is even recognized. The immediate cause of drought is the predominant sinking motion of air (subsidence) that results in compressional warming or high pressure, which inhibits cloud formation and results in lower relative humidity and less precipitation. Most climatic regions experience varying degrees of dominance by high pressure, often depending on the season. Prolonged droughts occur when large-scale anomalies in atmospheric circulation patterns persist for months or seasons (or longer). The extreme drought that affected the United States and Canada during 1988 resulted from the persistence of a large-scale atmospheric circulation anomaly (National Drought Mitigation Center, 2004).

There have been four major statewide droughts since the early 1900's (USGS, 2002). The drought of 1930-32 was one of the most severe recorded in the Commonwealth while the droughts of 1938-42 and 1962-71 were less severe; however, the cumulative stream flow deficit for the 1962-71 drought was the greatest of the droughts because of its duration. The drought of 1980-82 was the least severe and had the shortest duration. Tidewater Virginia experienced "Severe Drought" conditions during the drought of 2001-2002 when stream flow into Chesapeake Bay was only half the average annual flow into the Bay (Virginia State Climatology Office, 2002).

In 2007, seventeen counties fell into severe drought status as over $10 million in crop damages occurred in Southwest Virginia. Virginia is one of 44 states that have implemented a Drought Plan. The goals of these plans are to reduce water shortage impacts, personal hardships, and conflicts between water and other natural resource users. These plans promote self-reliance by systematically addressing issues of principal concern. The National Drought Policy Commission's report to Congress and the president, "Preparing for Drought in the 21st Century" , emphasizes the need for drought planning at the state, local, federal, and tribal levels of government. While some state plans focus on mitigation strategies, Virginia's Plan emphasizes response strategies.

In a parallel effort, Middle Peninsula localities with the exception of Gloucester County, participated in the development of the Middle Peninsula Regional Water Supply Plan (MPRWSP) in 2011 and the update in 20216. Gloucester County participated in the development of the Hampton Roads Regional Water Supply Plan. Overall, the water supply plans contain proposed strategies and polices that localities can undertake to mitigate adverse effects of periodic droughts. As both the Regional Water Supply Plan and Drought Response plans focus on responding to drought, both plans should identify the role the jurisdiction's Emergency Services Coordinator/Manager will have with the locality's County Administrator/Town Manager during the implementation of both plans.

Drought Vulnerability

Drought is a phenomenon that, affects the Commonwealth on nearly an annual basis. Drought has several definitions, depending upon the impact. **Agricultural drought** is the most common form of drought and is characterized by unusually dry conditions during the growing season. **Meteorological drought** is defined as an extended period (generally 6 months or more) when precipitation is less than 75 percent of

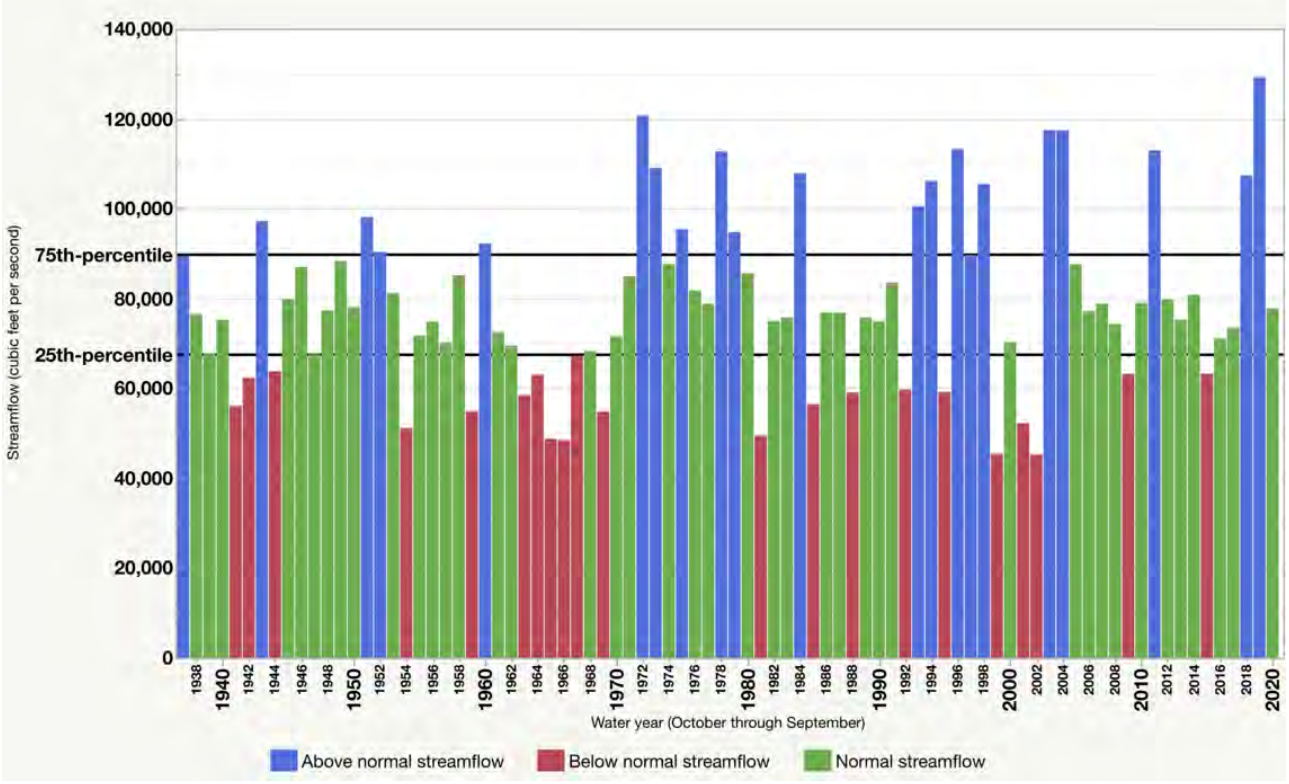
normal during that period. If coincident with the growing season, agricultural and meteorological drought can occur simultaneously. In general, hydrologic drought is the most serious, and has the most wide-reaching consequences. **Hydrologic drought** occurs due to a protracted period of meteorological drought, which reduces stream flows to extremely low levels ("Dry years" in Figure 6) and creates major problems for public (reservoir/river) and private (well) water supplies.

Extended periods of drought can impact crop and hay yields, and significant crop losses can result. The impact of meteorological drought can vary significantly depending upon dry years. In Figure 6 the red bars indicate the length of the dry period, the time of year the dry period occurs, the antecedent moisture conditions prior to the onset of the dry period, and the relative dryness (in percent of normal precipitation) of the period in question. Drought duration is highly variable by region. The duration also depends on when the precipitation is needed for such activities as planting and irrigation.

In addition to the primary impacts of drought, there are also secondary impacts that can increase the potential for other hazards to occur. Extended periods of drought can increase the risk of wildfire occurrences.

Specific impacts of drought to Middle Peninsula localities may be experienced differently; however economic losses may occur due to crop loss and water shortages.

Figure 6: Estimated annual mean stream inflow into Chesapeake Bay 1937 – 2020. *(USGS, 2021).*



Drought Extent (Impact)

To assist in identifying the severity of a drought event a classification system is utilized and will dictate public water restriction (Table 7). Notice that water restrictions start as voluntary and then become required as the severity of the drought increases.

Table 7: Drought Severity Classification (U.S. Drought Monitor, 2021)		
Category	**Description**	**Possible Impacts**
D0	Abnormally Dry	Going into drought: short-term dryness slowing planting, growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate Drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing, or imminent, voluntary water use restrictions requested
D2	Severe Drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed
D3	Extreme Drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

The US Drought Monitor provides a history of drought events within Middle Peninsula localities.

4.2.3. Shrink-swell Soils

Various areas of the Middle Peninsula have expandable soils that have the potential to shrink and /or swell with changes in moisture content. The sensitivity of a soil to shrink or swell is related to the amount of clay minerals in the soil. These soils are very affected by changes in moisture content. They have a high tendency to expand (swell) when receiving a lot of moisture and contract (shrink) during times of little or no precipitation. Soils that have a high shrink-swell rating may cause damage to buildings, roads, or other structures if not compensated for by engineering. Special designs are often needed for construction on such soils.

House Joint Resolution No. 243 (passed by the Virginia House of Delegates and Senate in March 1996) requires mandatory education for Virginia building code officials on the issue of expansive soils. Where expansive or other problem soils are identified, various methods for responding to them are permitted, including removal and replacement of soils, stabilization by dewatering or other means, or the construction of special footings, foundations, or slabs on how to deal with such soil conditions. This mandatory education is intended to provide guidance on the type of construction techniques to be employed where problem soils are present. While not preventing a site from being used, a high shrink-swell capability places a potential restriction on the size and weight of the building that may be built upon it.

Shrink-swell soils are not specifically addressed in the Essex County Comprehensive Plan (1998 & 2015), however soils associations are generally described. The Rappahannock-Molena-Pamunkey soil association is located on tidal marshes along the Rappahannock River and along floodplain of major creeks that feed into the river. The soil association is predominately Rappahannock soils, which are not suitable for any type of development because of flooding, high water table, and high organic content. These soils are very poorly drained with a surface layer of loam and subsurface of loam, fine sandy loam, and clay loam. About half of the land within this soil association is farmed; the rest is tidal and freshwater marshes. Some areas are used for waterfront development, but seasonal wetness, flooding, and unsuitability for septic systems limits the uses of this land. The suitability of the soil for septic systems and for agriculture is a prime consideration in making general land use policy decisions in Essex County.

Parts of the Town of Tappahannock consist of soils of the Rappahannock-Molena-Pamunkey soil association, primarily along Hoskin's Creek and Tickner's Creek (Town of Tappahannock Comprehensive Plan, 2014). These areas are not suitable for development, therefore eliminating potential problems associated with structures built on shrink-swell soils.

Shrink-swell soils are not specifically addressed in the Gloucester County Comprehensive Plan (amended 2016). However, in an analysis of soil suitability for development, clayey soils account for roughly 6,600 acres, or approximately 5% of the area of the county. Because these conditions are often coincident with shrink-swell soils, this is an approximate estimation of shrink-swell soil conditions within the county. These clayey soils are also listed as being unsuited for housing septic systems. The Gloucester County Land Use Plan generally coordinates the Bayside Conservation District and Resource Conservation District with large areas of soils unsuitable for septic tank use or otherwise unsuitable for high density or commercial development due to physical constraints.

The King & Queen County Comprehensive Plan (2019) includes a map of Shrink Soils in the County that shows high levels near the Dragon Run area of the County. The Comprehensive Plan also includes a detailed soil survey of the County.

Only one area in King William County (Bohicket) is rated high for shrink-swell soils (King William Comprehensive Plan, 2003). According to the Comprehensive Plan, the County uses the Soil Survey results in formulating future land use policies. Goals and implementation strategies within the County's Comprehensive Plan include increasing public awareness of potential problems resulting from building on soils with moderate to high shrink-swell characteristics, discouraging development in areas that are unsuited for development because of soil conditions, continue policies that require soil feasibility studies prior to approval of residential rezoning, include in the plan review process a requirement for evaluating shrink-swell soil qualities, and provide builders and developers with advice and information on shrink-swell qualities of soils and the need to evaluate these conditions before committing to construction. Shrink-Swell soils are not addressed in the Town of West Point's Comprehensive Plan (2000).

High shrink-swell soils are present in the northeastern tip of Mathews County and along the waterfront of the rivers and streams. Most of the wetlands in the County and most of the areas within the Chesapeake Bay Resource Protection Areas (protected from development by the Chesapeake Bay Preservation Act, adopted by the Virginia General Assembly in 1988) are shrink-swell soils. These soils account for just a little more than 7,000 acres of Mathews County.

According to the Middlesex County Comprehensive Plan (2009), shrink-swell soils within Middlesex County limit community development in the Ackwater, Craven, and Slagle soil series. Together, the lands comprised of these soils make up approximately 12,350 acres, or roughly 15% of the area of the county. Community development in these areas is restricted because the limitations caused by these soils cannot normally be overcome without exceptional, complex, or costly measures.

Only low to moderate shrink-swell soil potential exists in the Town of Urbanna, leaving the soils of the Town generally moderately suited for development (Town of Urbanna Comprehensive Plan, 2012). The Town's Comprehensive Plan states that individual sites should be examined in detail prior to any development.

Therefore, it's important to note that there are varying degrees of vulnerability amongst Middle Peninsula localities.

Shrink-swell Soil Vulnerability

As shrink-swell soils expand and shrink this may cause pressure and stress on house foundations. If foundations are not properly designed to handle this, then the foundation may crack, ultimately causing harm to residents.

Shrink-swell Soil Extent (Impact)
Shrink–swell is the volume change that occurs as a result of changes in the moisture content of clay-rich soils. Swelling pressures can cause heave, or lifting of structures, while shrinkage can cause settlement or subsidence. subsidence. Fine-grained, clay-rich soils can absorb large quantities of water after rainfall, becoming sticky and heavy. Conversely, they can also become very hard when dry, resulting in shrinking and cracking of the ground. This hardening and softening is known as 'shrink–swell' behavior. Damage to buildings may occur when the volume change of the soil, due to shrinking or swelling, is unevenly distributed beneath the foundations. For example, if there is a difference in water content in the ground beneath a building, swelling pressures can cause the wall to lift; this is often called 'heave'. This can happen at the corners or towards the center of a building. Subsidence on the other hand is a lowering or collapse of the ground.

According to the US Department of Agriculture, Natural Resources Conservation Service, shrink-swell classes are based on the change in length of an unconfined clod (lump of earth and clay) as moisture content is decreased from a moist to a dry state. If this change is expressed as a percent, the value used is Linear extensibility percent (LEP). LEP is the linear expression of the volume difference of natural soil fabric at 1/3-bar or 1/10-bar water content and oven dryness. The volume change is reported as percent change for the whole soil. If it is expressed as a fraction, the value used is COLE, coefficient of linear extensibility. The shrink-swell classes are defined as follows:

Shrink-Swell Class	LEP	COLE
Low	<3	<0.03
Moderate	3 - 6	0.03 - 0.06
High	6 - 9	0.06 - 0.09
Very High	≥9	≥0.09

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can damage buildings, roads, and other structures. The high degree of shrinkage associated with high and very high shrink-swell potentials can damage plant roots.

4.2.4. Earthquakes

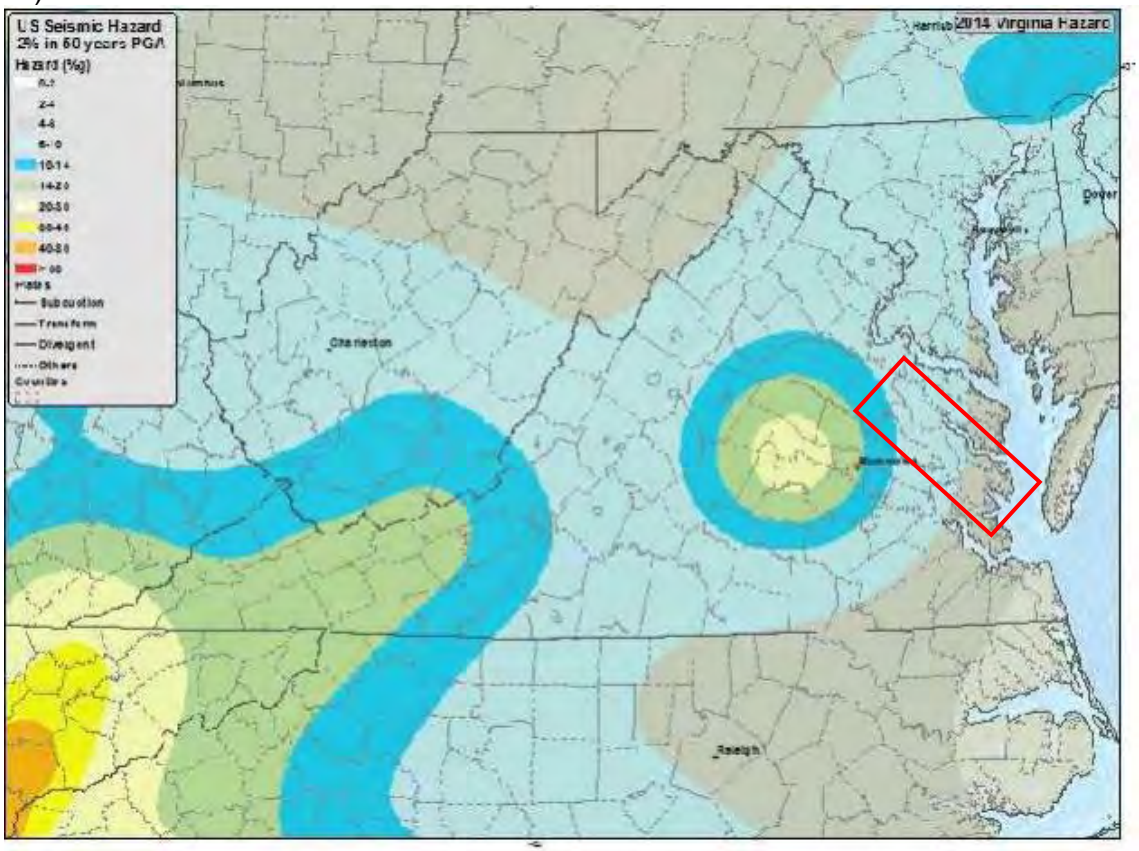
An earthquake is a sudden movement or trembling of the Earth, caused by the abrupt release of strain that has accumulated over a long time. For hundreds of millions of years, the forces of plate tectonics have shaped the Earth as the huge plates that form the Earth's surface slowly move over, under, and past each other. Sometimes the movement is gradual; at other times, the plates are locked together, unable to release the accumulating energy. When the accumulated energy grows strong enough, the plates break free and result in an earthquake (Shedlock and Pakister, 1997). If the earthquake occurs in a populated area, it may cause deaths, injuries, and extensive property damage.

Earthquake Vulnerability
During an earthquake when the ground is shaking, it experiences acceleration. The peak acceleration (PA) is the largest acceleration recorded by a particular station during an earthquake (expressed as %g). When acceleration acts on a physical body, the body experiences the acceleration as a force. The force most experienced is the force of gravity, which causes one to have weight. Units of acceleration are measured in terms of g, the acceleration due to gravity. For example, an acceleration of 11 feet per second per second

is 11*12*2.54 = 335 cm/sec/sec. The acceleration due to gravity is 980 cm/sec/sec, so an acceleration of 11 feet/sec/sec is about 335/980= 0.34 g. Expressed as a percent; 0.34 g is 34 %g.

The United States Geological Survey (USGS) rates the susceptibility of areas of the United States to earthquakes and has published risk maps, which give the probability of various levels of ground motion being exceeded in 5 years. An approximate threshold for shaking that causes building damage (for pre-1965 dwellings or dwellings not designed to resist earthquakes) is 10 %g. According to USGS predictions, the Middle Peninsula is located within the 1-2%g, 2-3%g and 3-4%g contour lines (Figure 7).

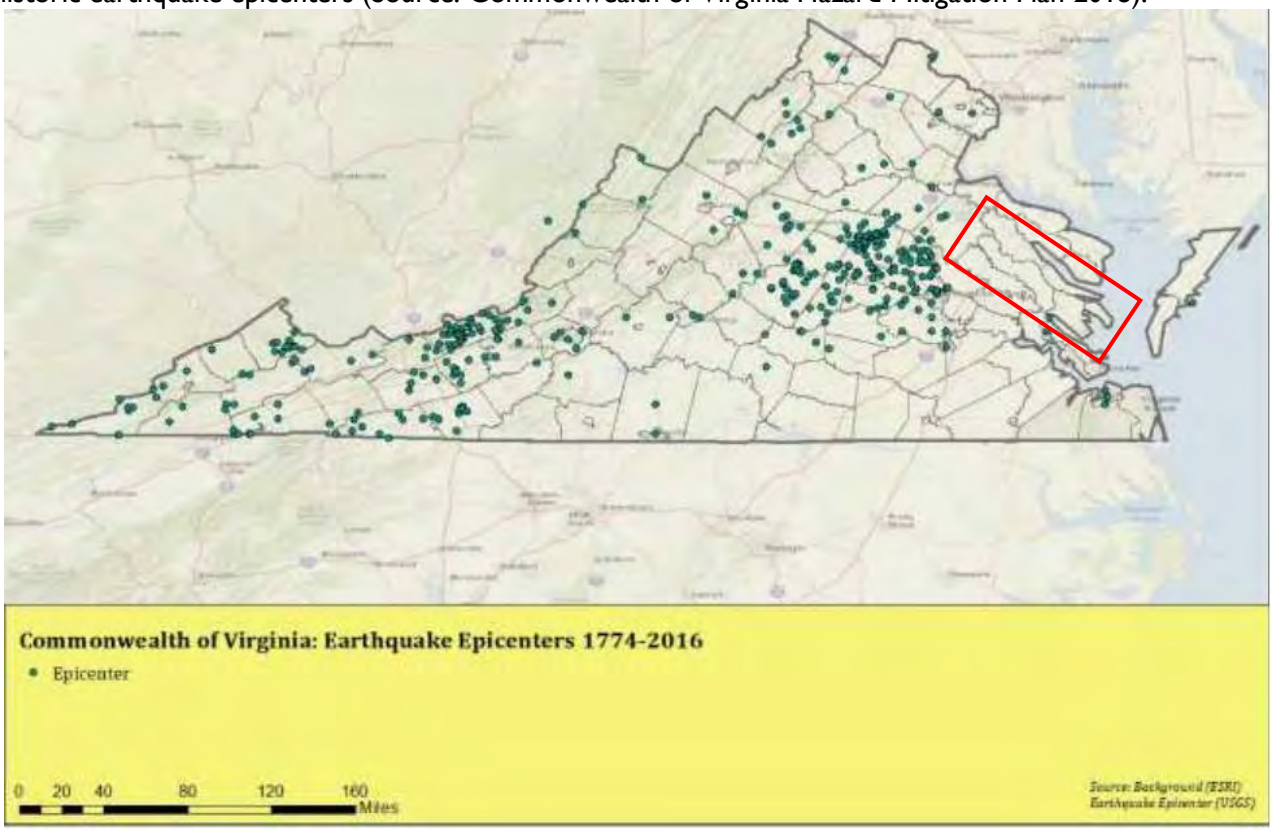
Figure 7: Seismic- Hazard Map of Virginia. Earthquake hazard map showing peak ground accelerations having a 2 percent probability of being exceeded in 60 years. The Middle Peninsula of Virginia (hi-lighted by the red square on the map) falls within the blue, light blue, and green polygons. Image courtesy USGS (2018).



Historical data is supportive of this low risk assessment. Virginia has experienced over 498 documented earthquakes from 1774 and 2016. Figure 8 depicts the historical earthquake epicenters in and near Virginia from 1774 and 2016. The largest earthquake in Virginia was a magnitude 5.8 earthquake in Giles County in 1897. This earthquake was the third largest in the eastern US in the last 200 years was felt in twelve states. Based on the map there were no earthquake epicenters recorded within the area of the Middle Peninsula. However, in 2011 a 5.8 earthquake in Mineral, Virginia was felt in the Middle Peninsula region and caused damages according to VDEM.

Depending on the epicenter of the earthquake Middle Peninsula localities may experience varying impacts. According to the USGS (2018) the eastern most portions of Mathews and Gloucester County have a lower chance of being impacted by earthquakes.

Figure 8: Virginia Earthquakes 1774 – 2016 - Historical earthquake epicenters in and near Virginia from 1774 through 2016. The Middle Peninsula of Virginia (highlighted by the red square on the map) is void of any historic earthquake epicenters (Source: Commonwealth of Virginia Hazard Mitigation Plan 2018).



Earthquake Extent (Impact)

The severity of an earthquake can be expressed in terms of both intensity and magnitude. However, the two terms are quite different, and are often confused. Intensity is based on the observed effects of ground shaking on people, buildings, and natural features. It varies from place to place within the disturbed region depending on the location of the observer with respect to the earthquake epicenter. Magnitude is related to the amount of seismic energy released at the hypocenter of the earthquake. It is based on the amplitude of the earthquake waves recorded on instruments which have a common calibration. The magnitude of an earthquake is thus represented by a single, instrumentally determined value.

Earthquake severity is commonly measured on two different scales: the Modified Mercalli Intensity scale and the Richter Magnitude scale. The following provides ranking and classification definitions for the two scales (Table 8).

Table 8: Ranking and classification definitions for two scales that measure earthquake severity.	
Richter Magnitude Scale	**Modified Mercalli Intensity Scale**
1.0 to 3.0	I
3.0 to 3.9	II to III
4.0 to 4.9	IV to V
5.0 to 5.9	VI to VII
6.0 to 6.9	VII to IX
7.0 and Higher	VIII or Higher
Defined Modified Mercalli Intensity Scale Rating	
I	Not felt except by a very few under especially favorable conditions.
II	Felt only by a few persons at rest, especially on upper floors of buildings.
III	Felt quite noticeably by persons indoors, especially on upper floors of buildings. Many people do not recognize it as an earthquake. Standing motor cars may rock slightly. Vibrations similar to the passing of a truck.
IV	Felt indoors by many, outdoors by few during the day. At night, some awakened. Dishes, windows, doors, disturbed; walls make cracking sound. Sensation like heavy truck striking building. Standing motor cars rocked noticeably.
V	Felt by nearly everyone; many awakened. Some dishes, windows broken. Unstable objects overturned. Pendulum clocks may stop.
VI	Felt by all, many frightened. Some heavy furniture moved; a few instances of fallen plaster. Damage slight.
VII	Damage negligible in buildings of good design and construction; slight to moderate in well-built ordinary structures; considerable damage in poorly built or badly designed structures; some chimneys broken.
VIII	Damage slight in specially designed structures; considerable damage in ordinary substantial buildings with partial collapse. Damage great in poorly built structures. Fall of chimneys, factory stacks, columns, monuments, walls. Heavy furniture overturned.
IX	Damage considerable in specially designed structures; well-designed frame structures thrown out of plumb. Damage great in substantial buildings, with partial collapse. Buildings shifted off foundations.
X	Some well-built wooden structures destroyed; most masonry and frame structures destroyed with foundations. Rails bent.
XI	Few, if any (masonry) structures remain standing. Bridges destroyed. Rails bent greatly.
XII	Damage total. Lines of sight and level are distorted. Objects thrown into the air.

4.2.5. Air Quality

Good air quality is taken for granted by most of the citizens of the Middle Peninsula of Virginia. However, there are natural and human-caused factors that may influence the air quality within the region.

First emissions from human activity can influence overall air quality within the region. From vehicle emissions to local businesses (ie. industry), Virginia Department of Environmental Quality (DEQ) Air Division's monitors and regulates emissions. DEQ is responsible for carrying out the mandates of the Virginia Air Pollution Control Law and the Federal obligations under the Clean Air Act on behalf of the State Air Pollution Control Board. For local industry, DEQ issues air quality permits to regulate emitted pollutants to ensure that emissions do not cause harm to the public or to the environment. Each year DEQ compiles an inventory of criteria pollutant air emissions from point, area, mobile, and biogenic sources (Table 9).

Table 9: 2019 Point Source Emissions Inventory. DEQ periodically compiles an inventory of criteria pollutant air emissions from point, area, mobile, and biogenic sources in the state. Point source emissions are inventoried annually (DEQ, 2021) for each Middle Peninsula Locality.

County	Site Name	Emissions (tons)							
		CO	NH3	NOX	PM 10	PM 2.5	SO2	VOC	Facility Total
Essex	Tidewater Lumber	0.00	0.00	0.00	13.00	13.00	0.00	0.00	26.00
Essex	FDP Brakes of Virginia	0.43	0.00	0.75	1.25	1.25	0.00	1.33	5.01
Essex	Perdue AgriBusiness LLC - Tappahannock/Essex	0.33	0.00	0.58	7.24	5.52	0.00	0.04	13.70
Essex	Essex Concrete Corporation - Tappahannock	0.00	0.00	0.00	0.41	0.41	0.00	0.00	0.82
Essex	O'Malley Timber Products, Inc.	5.55	0.00	2.04	4.81	3.00	0.23	9.84	25.47
Essex	Blue Ridge Lumber Co LLC - Millers Tavern	6.25	0.00	5.11	2.79	2.33	0.26	0.18	16.92
Gloucester	Vulcan - Gloucester	0.01	0.00	0.02	0.75	0.75	0.04	0.00	1.58
Gloucester	Philips Energy Inc	0.00	0.00	0.00	0.00	0.00	0.00	8.48	8.48
Gloucester	Vulcan - Saluda	0.00	0.00	0.00	0.26	0.26	0.00	0.00	0.51
Gloucester	Canon Environmental Technologies Incorporated	0.00	0.00	0.00	22.68	22.68	0.00	0.00	45.35
Gloucester	Middle Peninsula Landfill	237.50	0.00	125.26	22.56	21.69	7.77	27.88	442.67
Gloucester	C. W. Davis Asphalt Division	0.00	0.00	0.00	0.07	0.07	0.00	0.00	0.15
Gloucester	Hogg Funeral Home	0.02	0.00	0.00	0.02	0.02	0.00	0.00	0.05
Gloucester	Bardon, Inc. d/b/a Aggregate Industries - Mid Atlantic Region (MAR)	0.00	0.00	0.00	2.09	0.37	0.00	0.00	2.46
Gloucester	Shadow Farms Animal Cremation Services Inc	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Gloucester	Courthouse Cremation Services Limited Liability Co	0.00	0.00	0.06	0.02	0.02	0.01	0.00	0.11
Gloucester	Contract Crushing/Construction Inc	0.03	0.00	0.06	0.00	0.00	0.00	0.01	0.09
King and Queen	Ball Lumber Company Incorporated	48.28	0.00	17.70	33.06	17.38	2.01	62.71	181.15
King and Queen	Bennett Mineral Company Inc	21.19	0.00	7.82	2.68	0.90	0.92	0.60	34.12
King and Queen	Essex Concrete Corporation - Aylett	0.00	0.00	0.00	6.26	6.26	0.00	0.00	12.51
King and Queen	BFI King and Queen Sanitary Landfill	22.70	0.00	4.60	58.20	7.40	3.50	11.75	108.15
King and Queen	INGENCO - King and Queen	170.26	0.00	122.25	15.99	14.39	19.49	64.00	406.39
King and Queen	Helena Agri-Enterprises LLC - Portable 52353	0.00	0.00	0.00	0.06	0.05	0.00	0.00	0.11
King and Queen	Virginia Sand & Stone LLC	0.00	0.00	0.00	0.11	0.00	0.00	0.00	0.11
King and Queen	Premier Tech Horticulture	0.00	0.00	0.00	0.03	0.01	0.00	0.00	0.04
King and Queen	Virginia Sand & Stone LLC - Portable 52674	0.00	0.00	0.00	0.06	0.02	0.00	0.00	0.08
King William	Coldwater Veneer Incorporated	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
King William	Trible-Perry Oil Co/PAPCO Oil Co.	0.00	0.00	0.00	0.00	0.00	0.00	1.84	1.84
King William	WestRock CP LLC - West Point	1,362.21	0.00	1,516.17	263.81	226.30	607.58	500.32	4,476.38
King William	Old Dominion Grain	0.21	0.00	0.25	8.96	1.54	0.00	0.01	10.98

King William	Augusta Wood Products LC - Sawmill	1.08	0.00	0.15	4.13	4.13	0.03	18.91	28.44
King William	NPPC King William	45.72	0.00	61.33	37.26	19.69	0.29	2.62	166.91
King William	West Point Chips Incorporated	0.00	0.00	0.00	33.68	33.68	0.00	0.00	67.37
King William	Aggregate Industries MAR - Mattaponi Plant	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
King William	US Mining Incorporated	0.00	0.00	0.00	0.47	0.47	0.00	0.00	0.94
King William	Vincent Funeral Home - West Point	0.03	0.00	0.02	0.00	0.00	0.01	0.02	0.08
King William	King William Sand and Gravel - Queenfield Mine	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
King William	Caring Pet Cremation Services LLC	0.02	0.00	0.02	0.00	0.00	0.00	0.00	0.04
Mathews	Wroten Oil Company	0.00	0.00	0.00	0.00	0.00	0.00	2.34	2.34
Middlesex	J T and C A Thrift Incorporated	0.00	0.00	0.00	0.00	0.00	0.00	1.76	1.76
Middlesex	Middle Peninsula Cremation Service LLC	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.03
Total Regional Admissions		1,921.82	0.00	1,864.19	542.73	403.61	642.16	714.63	6,089.14

**Note: Blank squares within the table indicate that there are no emissions to be measured.
NH_3 – Ammonia; **NOX**- Nitrogen oxides; **PM 10** –particulate matter 10 micrometers or less in diameter; **PM 2.5** – particulate matter 2.5 micrometers or less in diameter, generally described as fine particles; **SO_2**- Sulfur dioxide; **VOC**- Volatile organic compound

With the passing of the Clean Air Act in 1970 and then amendments in 1990, US Congress required DEQ to enhance the vehicle emissions inspection program to improve air quality and to reduce emission further. In response Virginia requires the inspection of vehicles operating in the counties of Arlington, Fairfax, Loudoun, Prince William, Stafford and the Cities of Alexandria, Fairfax, Falls Church, Manassas, and Manassas Park. Vehicle emissions contain pullulates that contribute to the formation of ozone, the main component of smog. Smog builds up at ground level on hot sunny days and may even impact water quality in the Chesapeake Bay and its tributaries through atmospheric deposition.

In conjunction with emissions caused by humans there are natural emissions, such as forest fires and controlled burns, that have the potential to cause air quality to deteriorate and become unsafe, especially for those who suffer from medical conditions that make them sensitive to poor air quality. As a rural region of Virginia, the Middle Peninsula landscape is dominated by fields and forests. To properly manage these resources, property owners may carry out prescribed burning, a deliberate use of fire under specified and controlled conditions to achieve a resource management goal. Benefits including:

- site preparation for reforesting,
- hardwood control in pine stands,
- wildfire hazard reduction,
- improved wildlife habitat, and
- threatened and endangered species management.

According to the VDOF: *Products from the combustion of forest fuels are mainly carbon-containing compounds. The most important pollutants being particulate matter and carbon monoxide (CO).*

Two products of complete combustion are carbon dioxide (CO2) and water, these make up over 90% of the total emissions. Under ideal conditions it takes 3.5 tons of air to completely burn 1 ton of fuel. The combustion of 1 ton of fuel will produce the following:

Carbon dioxide (CO2)	*2,000 to 3,500 lbs*
Water Vapor	*500 to 1,500 lbs*
Particulate Matter	*10 to 2000 lbs*
Carbon Monoxide (CO)	*20 to 500 lbs*
Hydrocarbons	*4 to 40 lbs*
Nitrogen Oxides	*1 to 9 lbs*
Sulfur Oxide	*Negligible amounts*

To assist with the management of the smoke generated from prescribed burning, the VDOF has developed voluntary smoke management guidelines to lessen impacts to public health and welfare. In additional to prescribed burns there are also unplanned forest fires that may impact the region's air quality. For instance, on August 4, 2011, a lightning strike caused a fire in the Great Dismal Swamp that kept smoldering for 111 days. This impacted air quality in Southern Virginia, Middle Peninsula Localities, and northward across Virginia and as far as Annapolis, Maryland. Wind currents over the Chesapeake Bay provided a channel for the ash-heavy smoke to travel north and caused a CODE ORANGE (See Table 10 below) for most of coastal Virginia.

Each locality within the Middle Peninsula will have varying vulnerability to air quality impacts. Localize events (i.e. wildfires, emissions for business, etc.) and wind currents may influence air quality within a given area at a given time.

Air Quality Extent

To monitor and assess daily air quality, the Environmental Protection Agency (EPA) has established the Air Quality Index (AQI). This scale determines how clean or polluted the air is and its impacts on human health. Based on a 0-500 scale, the higher the AQI value the greater the level of air pollutions and the greater the health concern. Table 10 identifies the AQI levels of health concern, the associated numerical value, and the meaning:

Table 10: AQI Scale. AQI levels and associated numerical values and meaning of the index (AirNow, 2015).

Air Quality Index Levels of Health Concern	Numerical Value	Meaning
Good	0 to 50	Air Quality is considered satisfactory, and air pollution poses little or no risk.
Moderate	51 to 100	Air quality is acceptable; however, there may be a risk for some people particularly those who are unusually sensitive to air pollution.
Unhealthy for Sensitive Groups	101 to 150	Members of sensitive groups may experience health effects. The general public is less likely to be affected.
Unhealthy	151 to 200	Some members of the general public may experience health effects; members of sensitive groups may experience more serious health effects.
Very Unhealthy	201 to 300	Health alert: The risk of health effects is increased for everyone.
Hazardous	301 to 500	Health warning of emergency conditions: everyone is more lilkely to be affected.

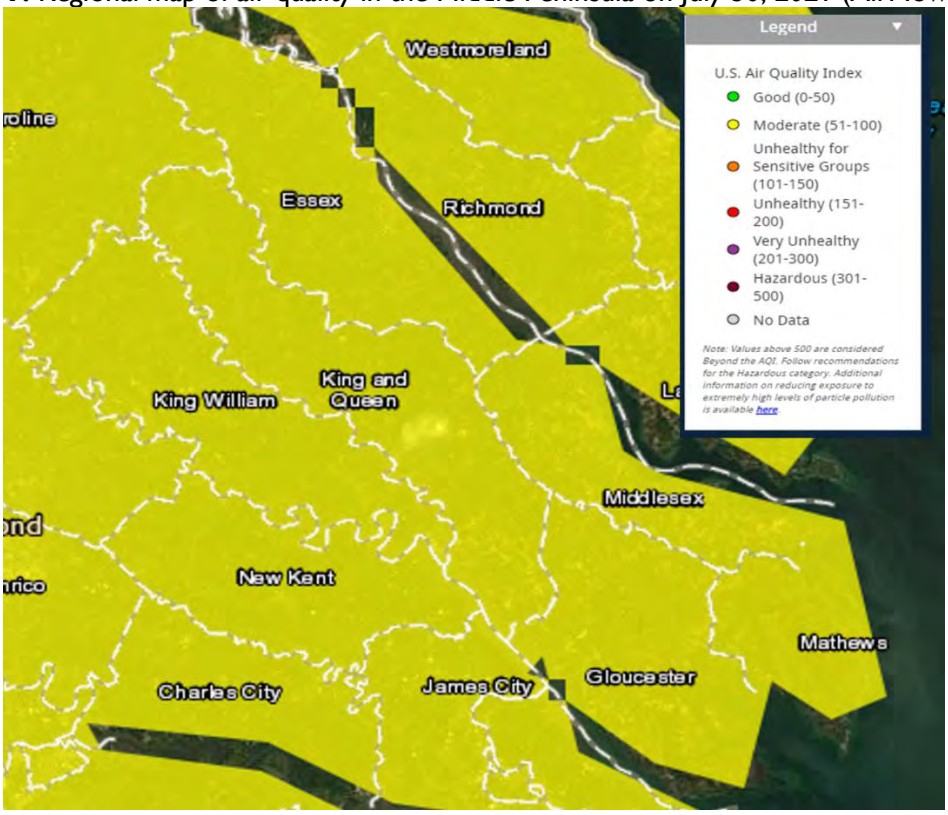
Based on this scale the EPA will calculate daily AQI number for each of the five major air pollutants regulated by the Clean Air Act, including ground ozone, particle pollution, carbon dioxide, sulfur dioxide, and nitrogen dioxide (Table 11).

Table 11: Description of regulated pollutants *(AirNow, 2015)*.

Pollutant	Description
Ozone (O_3)	Ozone is a form of oxygen with three atoms instead of the usual two atoms. It is a photochemical oxidant and, at ground level, is the main component of smog. Unlike other gaseous pollutants, ozone is not emitted directly into the atmosphere. Instead, it is created in the atmosphere by the action of sunlight on volatile organic compounds and nitrogen oxides. Higher levels of ozone usually occur on sunny days with light winds, primarily from March through October. An ozone exceedance day is counted if the measured eight-hour average ozone concentration exceeds the standards.
Carbon Monoxide (CO)	Carbon Monoxide (CO) is a colorless, odorless, very toxic gas produced by the incomplete combustion of carbon-containing fuels, most notably by gasoline powered engines, power plants, and wood fires. CO can cause harmful health effects by reducing oxygen delivery to the body's organs (like the heart and brain) and tissues. At extremely high levels, CO can cause death.
Sulfur Dioxide (SO_2)	Sulfur dioxide (SO_2) is one of a group of highly reactive gasses known as "oxides of sulfur." The largest sources of SO_2 emissions are from fossil fuel combustion at power plants (73%) and other industrial facilities (20%). Smaller sources of SO_2 emissions include industrial processes such as extracting metal from ore, and the burning of high sulfur containing fuels by locomotives, large ships, and non-road equipment. SO_2 is linked with a number of adverse effects on the respiratory system.
Nitrogen Dioxide (NO_2)	Nitrogen dioxide (NO_2) is one of a group of highly reactive gasses known as "oxides of nitrogen", or "nitrogen oxides (NO_x)". Other nitrogen oxides include nitrous acid and nitric acid. While EPA's National Ambient Air Quality Standard covers this entire group of NO_x, NO_2 is the component of greatest interest and the indicator for the larger group of nitrogen oxides. NO_2 forms quickly from emissions from cars, trucks and buses, power plants, and off-road equipment. In addition to contributing to the formation of ground-level ozone and fine particle pollution, NO_2 is linked with a number of adverse effects on the respiratory system.
Particulate Matter (PM-2.5 PM-10)	Particle pollution (also called particulate matter or PM) is the term for a mixture of solid particles and liquid droplets found in the air. Some particles, such as dust, dirt, soot, or smoke, are large or dark enough to be seen with the naked eye. Others are so small, they can only be detected using an electron microscope. Particle pollution includes *inhalable coarse particles*, with diameters larger than 2.5 micrometers and smaller than 10 micrometers and *fine particles*, with diameters that are 2.5 micrometers and smaller. How small is 2.5 micrometers? Think about a single hair from your head. The average human hair is about 70 micrometers in diameter -- making it 30 times larger than the largest fine particle. These particles come in many sizes and shapes and can be made up of hundreds of different chemicals. Some particles, known as *primary particles*, are emitted directly from a source, such as construction sites, unpaved roads, fields, smokestacks, or fires. Others form in complicated reactions in the atmosphere of chemicals such as sulfur dioxides and nitrogen oxides that are emitted from power plants, industries, and automobiles. These particles, known as *secondary particles*, make up most of the fine particle pollution in the country. Coarse particulates (PM-10) come from sources such as windblown dust from the desert or agricultural fields (sandstorms) and dust kicked up on unpaved roads by vehicle traffic. PM-10 data is the near real-time measurement of particulate matter 10 microns or less in size from the surrounding air. This measurement is made at standard conditions, meaning it is corrected for local temperature and pressure. Fine particulates (PM-2.5) are generally emitted from activities such as industrial and residential combustion and from vehicle exhaust. Fine particles are also formed in the atmosphere when gases such as sulfur dioxide, nitrogen oxides, and volatile organic compounds, emitted by combustion activities, are transformed by chemical reactions in the air. Large-scale agricultural burning or sandstorms can produce huge volumes of fine particulates. PM-2.5 data is the near real-time measurement of particulate matter 2.5 microns or less in size from the surrounding air. This measurement is made at local conditions and is not corrected for temperature or pressure.

AirNow.com provides a daily air quality forecast for select regions of Virginia including Hampton Roads, Northern Virginia, Richmond, Roanoke, Shenandoah National Park and Winchester. This site also provides calendars of air quality nationally and at the state level (Figure 9).

Figure 9: Regional map of air quality in the Middle Peninsula on July 30, 2021 (AirNow, 2021).



Air Quality Vulnerability

Poor air quality can impact a variety of factors including human health, the local economy, and the environment.

Human health impacts of air pollution can range from minor breathing problems to premature death. The more common effects include changes in breathing and lung function, lung inflammation, and irritation and aggravation of existing heart and lung conditions (e.g., asthma, emphysema, and heart disease). For instance, $PM_{2.5}$ and ground-level O_3 can affect human respiratory and cardiovascular systems. $PM_{2.5}$ and ground-level O_3 has also been associated with eye, nose and throat irritation, shortness of breath, exacerbation of respiratory conditions, chronic obstructive pulmonary disease and asthma, exacerbation of allergies, increased risk of cardiovascular diseases and premature death. Another example is as CO enters the lungs it forms a compound known as carboxyhemoglobin that inhibits the blood's capacity to carry oxygen to organs and issues. Therefore, heart disease patients may be sensitive to CO pollution. Finally, infants, elderly, and individuals with respiratory diseases may be sensitive to air pollution. Such negative health effects increase as the concentrations of pollutants in the air increase.

Economic impacts of air pollution can result from the health effects air pollution. Air pollution may not only reduce work attendance and overall participation in the labor force, but it can also increase health care costs, missed days of work, and reduce work productivity. Ultimately this impacts a local and regional economy and revenue. While the impacts to human health can be detrimental to the economy, increased O_3 levels may reduce the growth of crops, plants, and trees, leading to economic losses in agriculture and

forestry. Finally, smog can lower tourism since it reduces and impair visibility and enjoyability of surroundings and scenic views.

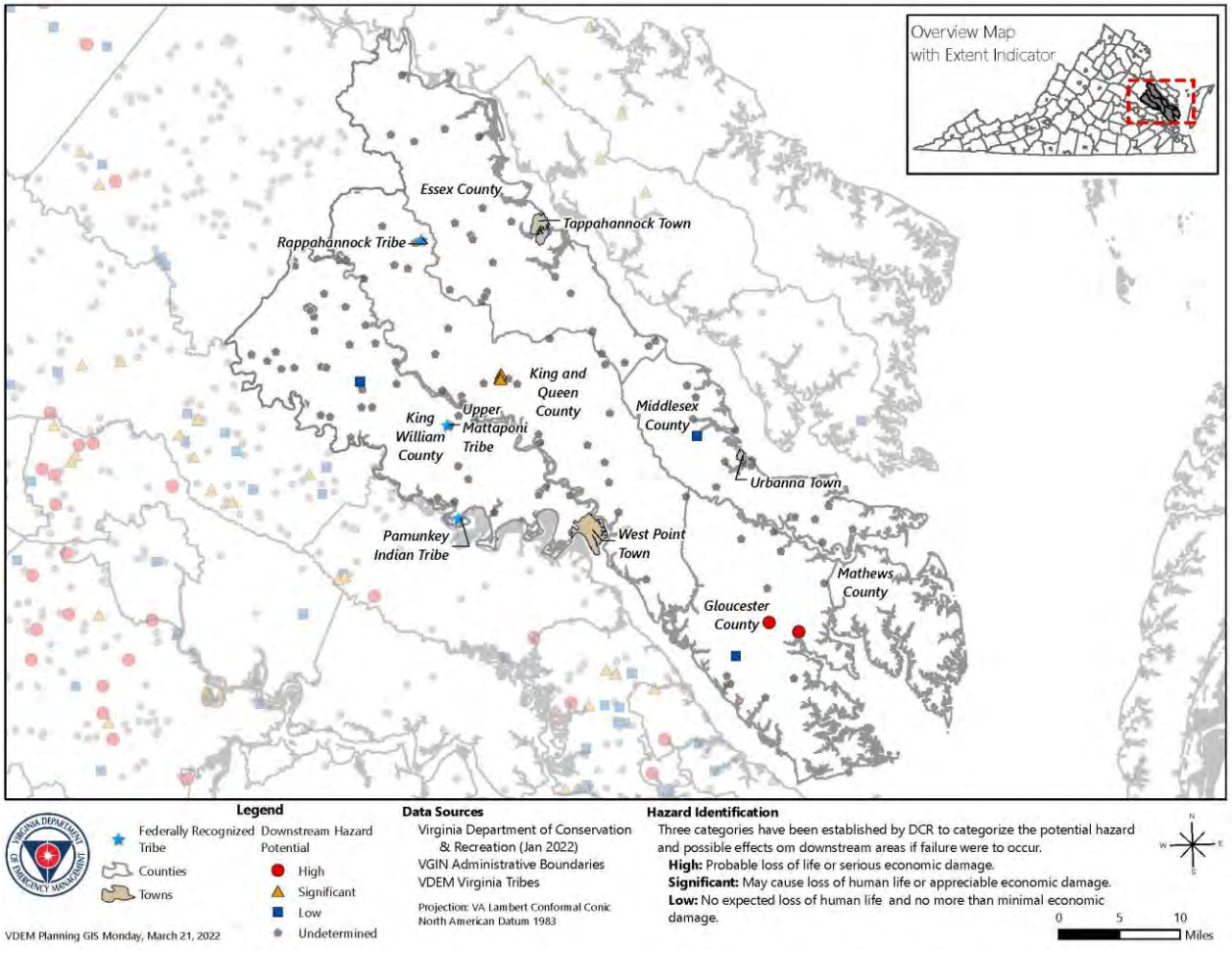
Environmental impacts of air pollution consist of:

- Ground-level O_3 can significantly impact vegetation and reduce the productivity of some crops. It can injure flowers and shrubs and may contribute to forest decline. Ecosystem changes can also occur, as plant species that are more resistant to O_3 can become more dominant than those that are less resistant.
- Plant response to PM is largely due to the resultant changes in soil chemistry rather than direct deposition on the plant. Various PM constituents taken up by the plant from the soil can reduce plant growth and productivity. PM can also cause physical damage to plant surfaces via abrasion.
- NO_x and SO_2 can become acidic gases or particulates, and cause or accelerate the corrosion and soiling of materials. Together with NH_3, they are the main precursors of acid rain. Acid rain affects soils and water bodies, and stresses both vegetation and animals.

4.2.6. Dam Failure & Risk

Based on 2021data from the US Army Corps of Engineers (USACE's) National Inventory of Dams (NID), there are approximately 2,760 dams in the Commonwealth (Figure 10) and 107 in the Middle Peninsula (Table 12).

Figure 10: Dam locations and associated hazard potential in the Commonwealth (Source: DCR, 2022).



Dam Failure Extent (Impacts)
As failure of dams may result in a localized major impact, including loss of human life, economic loss, lifeline disruption, and environmental impact such as destruction of habitat, there are also secondary impacts including flooding to the surrounding areas. Thus, a scale has been developed to classify the hazard potentials of dams due to their overall impact to a given area:

- **High** – dams that upon failure would cause probable loss of life or serious economic damage.
- **Significant** – dams that upon failure might cause loss of life or appreciable economic damage.
- **Low** – dams that upon failure would lead to no expected loss of life or significant economic damage. This classification includes dams that upon failure would cause damage only to property of the dam owner. **Special criteria** – includes dams that upon failure would cause damage only to property of the dam owner.

According to Virginia Department of Conservation and Recreation, the Middle Peninsula region has 130 dams. Table 12 shows the number of dams in each risk classification in each County in the region. Please see Appendix I for a list of all dams within the Middle Peninsula Region.

Table 12: Inventory of dams within the Middle Peninsula and their risk classification (DCR, 2022).

County	High	Significant	Low	Low, Special	Undetermined	Total # of Dams
Essex	0	0	0	0	23	23
Gloucester	2	0	1	0	10	13
King and Queen	0	3	0	0	25	28
King William	0	0	1	0	48	49
Mathews	0	0	0	0	0	0
Middlesex	0	0	1	0	16	17
TOTAL	2	3	3	0	122	130

Dam Failure Vulnerability
Dams are classified with a hazard potential depending on the downstream losses estimated in event of failure. The recent regulatory revisions bring Virginia's classification system into alignment with the system already used in the National Inventory of Dams maintained by the U.S. Army Corps of Engineers. Hazard potential is not related to the structural integrity of a dam but strictly to the potential for adverse downstream effects if the dam were to fail. Regulatory requirements, such as the frequency of dam inspection, the standards for spillway design, and the extent of emergency operations plans, are dependent upon the dam classification. The owner of each regulated Class I, II, and III dam is required to apply to the Soil and Water Conservation Board for an operation and maintenance certificate.

The Virginia DCR Division of Dam Safety's mission is to conserve, protect, enhance, and advocate the wise use of the Commonwealth's unique natural, historical, recreational, scenic, and cultural resources. The program's purpose is to provide for safe design, construction, operation, and maintenance of dams to protect public safety. Disaster recovery programs include assistance to dam owners and local officials in assessing the condition of dams following a flood disaster and assuring the repairs and reconstruction of damaged structures are compliant with the National Flood Insurance Program (NFIP) regulations.

For those dam failures that pose a risk when there are large potential areas with large populations surrounding dams. On-going dam inspections and Virginia's participation in the National Dam Safety Program maintained by FEMA and the U.S. Army Corps of Engineers serve as preventative measures against dam failures.

Most dam failures occur due to lack of maintenance of dam facilities in combination with excess precipitation events, such as hurricanes and thunderstorms. During Hurricane Floyd in 1999, floods broke open at least 12 unregulated dams in eastern Virginia. One of those failures, at the Cow Creek Dam near Gloucester Courthouse, temporarily closed state Route 14; No one was hurt. Rebuilding the dam cost about $160,000 (U.S. Water News Online, 2002). During Tropical Storm Gaston in late summer of 2004, a dam was overtopped in King William County and caused a washout of Route 610 between Rt. 608 and Rt. 609. The road was closed to traffic for several weeks (VDOT, 2004).

Each Middle Peninsula locality has a dam and therefore vulnerable to dam failure. However, the degree of vulnerability and impact will vary between the localities if a dam failure occurs. For instance, Gloucester County may experience the most impact from a failure at Beaver Dam as it is the largest in the region and has a high-risk classification. The 39-foot dam structure covers approximately 635 acres of land and is in close proximity to the Gloucester County Courthouse area which is a main residential and business corridor for the County. This increases the potential of economic loss.

Dam Impoundments

In 2001, Virginia's legislature broadened the definitions of "impounding structure" to bring more dams under regulatory oversight. On February 1, 2008, the Virginia Soil and Water Conservation Board approved major revisions to the Impounding Structure Regulations in the Virginia Administrative Code, changing the dam hazard potential classification system, modifying spillway requirements, requiring dam break inundation zone modeling, expanding emergency action plan requirements, and making a variety of other regulatory changes.

All dams in Virginia are subject to the Virginia Dam Safety Act and Dam Safety Regulations (updated in 2016) if:

1. the impounding structure is 25 feet or greater in height and creates a maximum impounding capacity of 15 acre-feet or greater.
2. the impounding structure is six feet or greater in height and creates a maximum impounding capacity of 50 acre-feet or greater

A dam is excluded from these regulations if it meets one or more of the following criteria:

1. Licensed by the State Corporation Commission that are subject to a safety inspection program.
2. Owned or licensed by the United States government.
3. Operated primarily for agricultural purposes that are less than 25 feet in height or that create a maximum impoundment capacity smaller than 100 acre-feet.
4. Water or silt-retaining dams approved pursuant to 45.1-222 or 45.1-225.1 of the Code of Virginia.
5. Obstructions in a canal used to raise or lower water levels.

The height of the dam is defined as *the hydraulic height of an impounding structure. If the impounding structure spans a stream or watercourse, height means the vertical distance from the natural bed of the stream or watercourse measured at the downstream toe of the impounding structure to the top of the impounding structure. If the impounding structure does not span a stream or watercourse, height means the vertical distance from the lowest elevation of the downstream limit of the barrier to the top of the impounding structure*. The maximum impounding capacity *means the volume of water or other materials in acre-feet that is capable of being impounded at the top of the impounding structure*.

The DCR – Division of Dam Safety is the state agency responsible for enforcing the Virginia Dam Safety Act and overseeing the issuance of Operation and Maintenance Certificates for regulated dams.

High Risk Dams

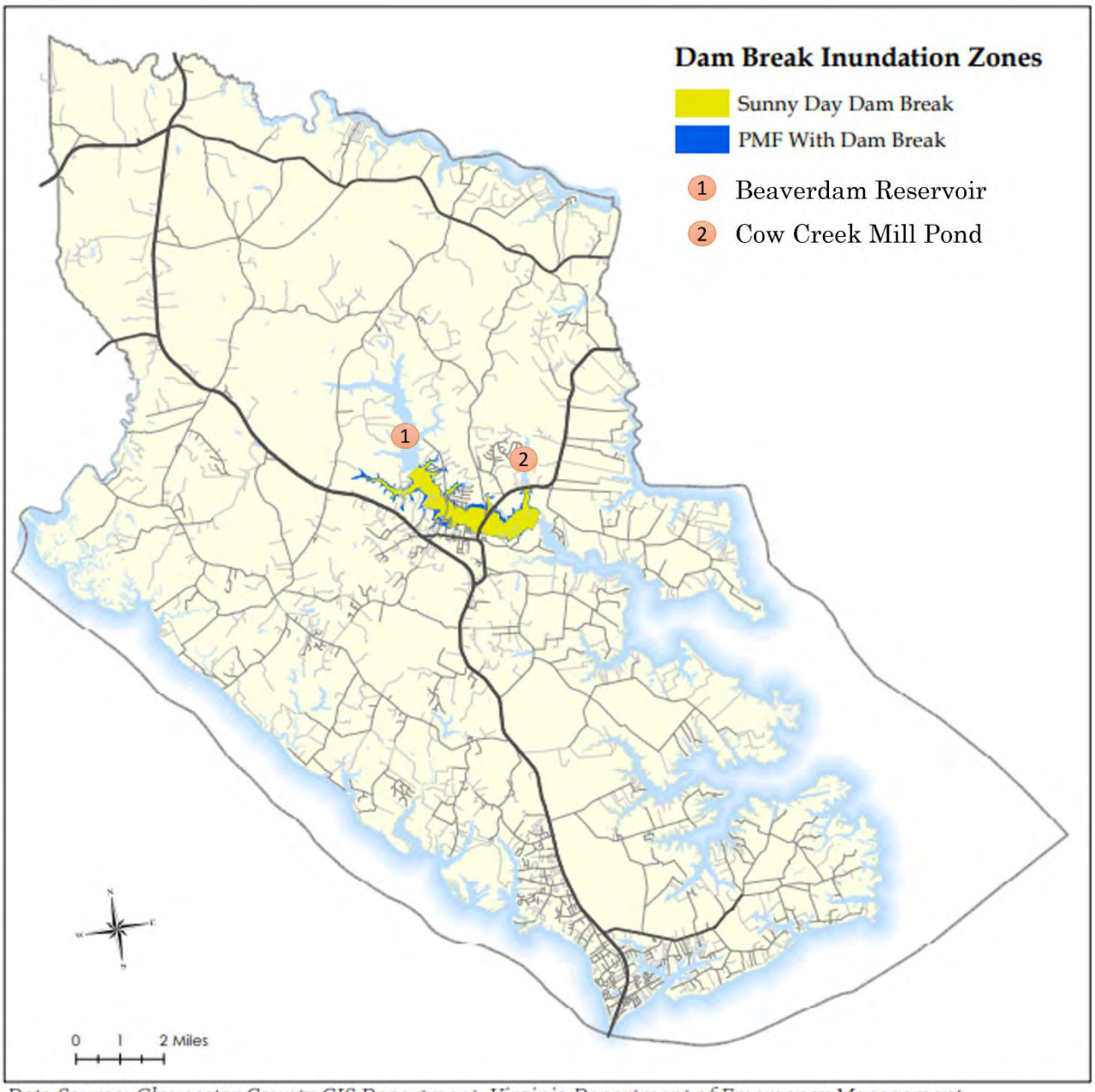
Beaverdam Reservoir Dam– Gloucester, County

The Beaverdam Reservoir is classified as high risk, located to the north of the Gloucester Courthouse area, is contained by a 39-foot dam structure, and covers approximately 635 acres of land. According to the Emergency Action Plan, *The Watershed area draining to Beaverdam Reservoir is 17.2 square miles consisting of woods, open space, roadways and residences. This area has experience very little development since the construction of the dam. The impounding structure for Beaverdam Reservoir, Beaverdam Reservoir Dam, is classified as a "High" hazard dam with a spillway design flood (SDF) equal to the probable maximum flood event (PMF). The dam is an earthfill, grass lined embankment with a regulatory height of about 40 feet and a length of about 2,030 feet. The embankment cross section generally consists of 3:1 (horizontal: vertical) upstream and downstream slopes, with a 14 foot wide rest at elevation 55, and a downstream toe at elevation 15.* The spillway consists of a 30 foot by 30-foot square concrete tower structure, with all four sides receiving flow from a 26-foot weir.

Failure mechanisms evaluated in the EAP include a sunny day dam failure and a spillway design flood am failure. The property is owned by Gloucester County, and it is an actively used local recreational site known as Beaverdam Park as well as a drinking water source for Gloucester County residents.

Figure 11 shows areas shaded in yellow and blue that would be inundated if the reservoir dam were to fail. According to Gloucester County officials, the shaded areas represent 405 homes just north of the Gloucester Courthouse Complex and the downtown business district that would be inundated if the dam failed. An emergency action plan was prepared and last revised on 12/22/2014. Beyond the information within the EAP there is no detailed risk assessment for this dam, including detailed maps of inundated areas, impacted structures, and loss estimates. A risk assessment for this high hazard dam has been added as a mitigation action, if funding becomes available.

Figure 11: Beaverdam Reservoir Dam and Cow Creek Mill Pond. *Flood Inundation Map (Source: Gloucester County Comprehensive Plan, 2016***).**



Data Source: Gloucester County GIS Department, Virginia Department of Emergency Management

Cow Creek Mill Pond Dam– Gloucester, County

The Cow Creek Mill Pond is classified as high risk, located east of the Gloucester Courthouse area. It is contained by a 16-foot earth dam structure and has a maximum storage capacity of 937 acres-feet. The dam is owned privately by the Cow Creek Mill Pond Association and is used for recreation. According to the EAP, *If the dam were to fail, Routes 14 and 3 are in danger due to the flood wave overtopping the roadway. There are further threats of danger along the roadway to nearby businesses and buildings. Under normal conditions, flow passes under Routhes14 and 3, the dam's concrete emergency spillway is capable of safely passing up to 5.7*

feet depth of water in the spillway before the am overtops. An emergency action plan was prepared and last revised on 4/15/2021.

Figure 11 shows areas shaded in yellow and blue that would be inundated due to dam failures. According to DCR's Quick Reference Summary of Cow Creek Dam, if this dam failed Route 14 and Route 3 would be impacted by inundation and 1 business has the potential of being impacted. Beyond the information there is no detailed risk assessment for this dam, including detailed maps of inundated areas, impacted structures, and loss estimates. A risk assessment for this high hazard dam has been added as a mitigation action if funding becomes available.

Lake Anna Dam

The Lake Anna Dam, located near Mineral in Louisa County, Virginia, creates an impoundment with a surface area of approximately 13,000 acres. Periodic major water releases from Lake Anna flow into the Pamunkey River can have adverse effects on river levels.

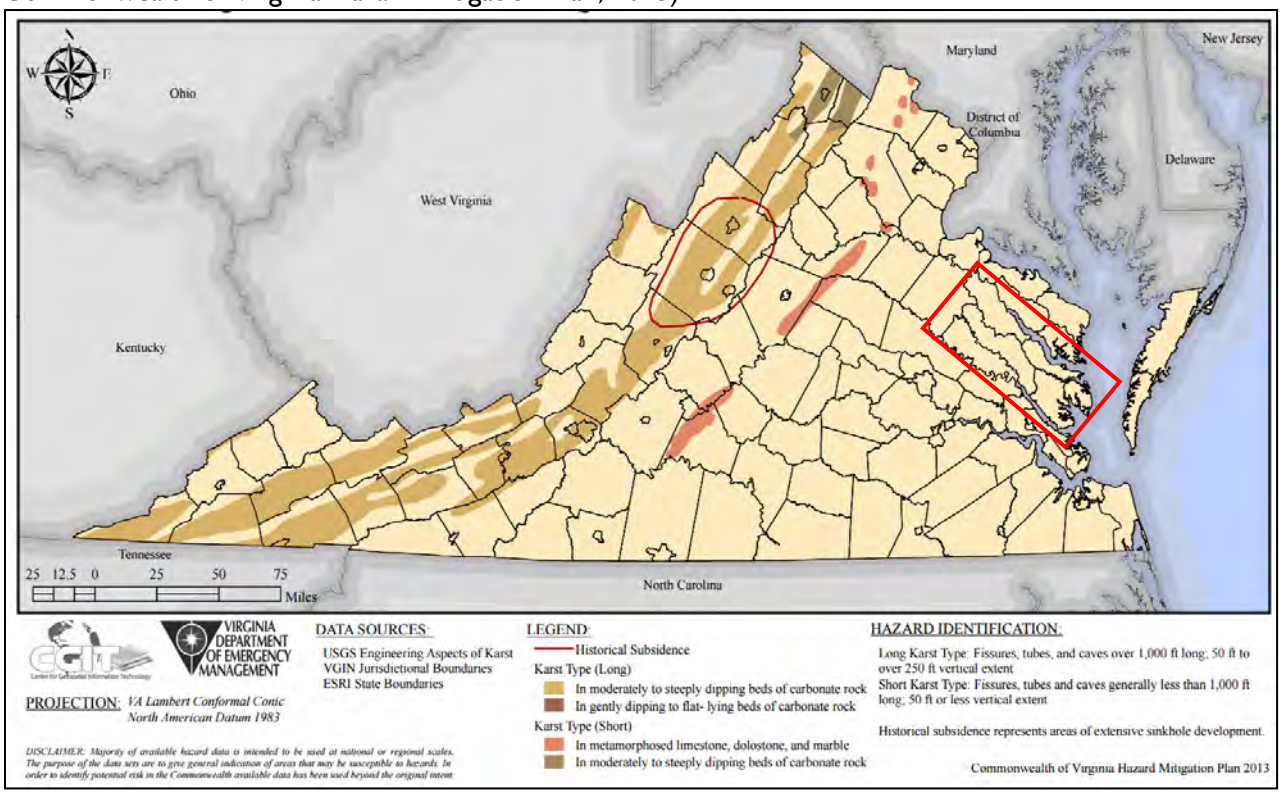
Depending on the amount of water released by the dam owner, Dominion Energy, a potential flooding hazard exists for King William County residents, which would include flooding of low-lying agricultural land, some roads, threes (3) bridges, a scattering of residences and some agricultural structures.

4.2.7. Land Subsidence due to Karst

According to the United State Geological Survey, land subsidence is the gradual settling or sudden sinking of the Earth's surfaces. Principal causes of land subsidence may include aquifer system compaction, drainage of organic soils, underground mining, hydro-compaction, natural compaction, sinkholes, and thawing permafrost. In particular, human activity such as withdrawing water, oil, or gas from underground reservoirs may cause land subsidence.

Land subsidence often occurs in regions with mildly acidic groundwater and where the geology is dominated by limestone, dolostone, marble or gypsum. In western parts of the Commonwealth the geology consists of karst which is limestone and similar soluble rocks. Therefore, as karst is easily dissolved by acidic groundwater sinkholes are created. Sinkholes are classified as natural depressions of the land surface. Areas with large amounts of karst are characterized by the presence of sinkholes, sinking streams, springs, caves, and solution valleys. As karst is not part of the Middle Peninsula geology, land subsidence due to karst does not occur within the region (Figure 12).

Figure 12: Karst regions and Historical Subsidence are primarily limited to the mountainous regions of the state. The area encompassing the Middle Peninsula is highlighted on the map with a red square. (Source: Commonwealth of Virginia Hazard Mitigation Plan, 2013)



While the Middle Peninsula may not be impacted by land subsidence due to karst it's important to note that the region is impacted by land subsidence due to water withdraws and rebounding land from the last glacial period. Land subsidence rates on the order of 0.05-0.06 in/yr (1.2-1.4 mm/yr) are attributed to the postglacial forebulge collapse within the Bay region (Douglas 1991). It can take many thousands of years for impacted regions to reach isostatic equilibrium.

Land Subsidence due to Karst Extent

The USGS recognizes four major impacts caused by land subsidence: (1) Changes in elevation and slope of streams, canals, and drains; (2) Damage to bridges, roads, railroads, storm drains, sanitary sewers, canals, and levees; (3) Damage to private and public buildings; and (4) Failure of well casings from forces generated by compaction of fine-grained materials in aquifer systems.

Land Subsidence due to Karst Extent

Since the Middle Peninsula region does not have karst, the region is not susceptible to land subsidence due to karst.

4.3. Hazards considered "Moderately-Critical" Hazards to the Middle Peninsula

The following sections describe hazards that have historically occurred in the Middle Peninsula yet ranked lower than the Critical Hazards in terms of risk during hazard prioritization. These hazards were deemed "Moderately-Critical Hazards" to the Middle Peninsula region by the LPT.

4.3.1 Tornadoes

The National Weather Service (NWS) defines a tornado as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. A condensation funnel does not need to reach to the ground for a tornado to be present; however, a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even without a condensation funnel. Tornadoes are distinguishable from waterspouts, which are small, relatively weak rotating columns of air over water beneath a cumulonimbus or towering cumulus cloud. Waterspouts are most common over tropical or subtropical waters. The exact definition of waterspout is debatable. In most cases the term is reserved for small vortices over water that are not associated with storm-scale rotation (i.e., they are the water-based equivalent of landspouts). Yet there is sufficient justification for calling virtually any rotating column of air a waterspout if it is in contact with a water surface.

Tornadoes often appear as a funnel shaped cloud or a spiraling column of debris extending from storm clouds to the ground. They are created during severe weather events like thunderstorms and hurricanes when cold air overrides a layer of warm air, causing the warm air to rise rapidly. Tornadoes may be only several yards across, or in rare cases, over a mile wide. Winds within a tornado can reach speeds over 250 mph, but most tornado winds are 100 mph or less. Weak tornadoes (categorized as F0 and F1 on the Fujita scale, Table 13 & 14) are most common in the Middle Peninsula and often last only a minute before dissipating. From 1951 through the year 2016, 848 tornadoes were documented in Virginia (Commonwealth of Virginia Hazard Mitigation Plan, 2018). Within Middle Peninsula localities 51 tornadoes that touched down between1950 to 2021 (See Appendix J). While most tornadoes touched down in the Middle Peninsula during April, July is considered the most active month for tornadoes in Virginia. The hot, humid days common to July are often accompanied by a late afternoon or evening thunderstorm.

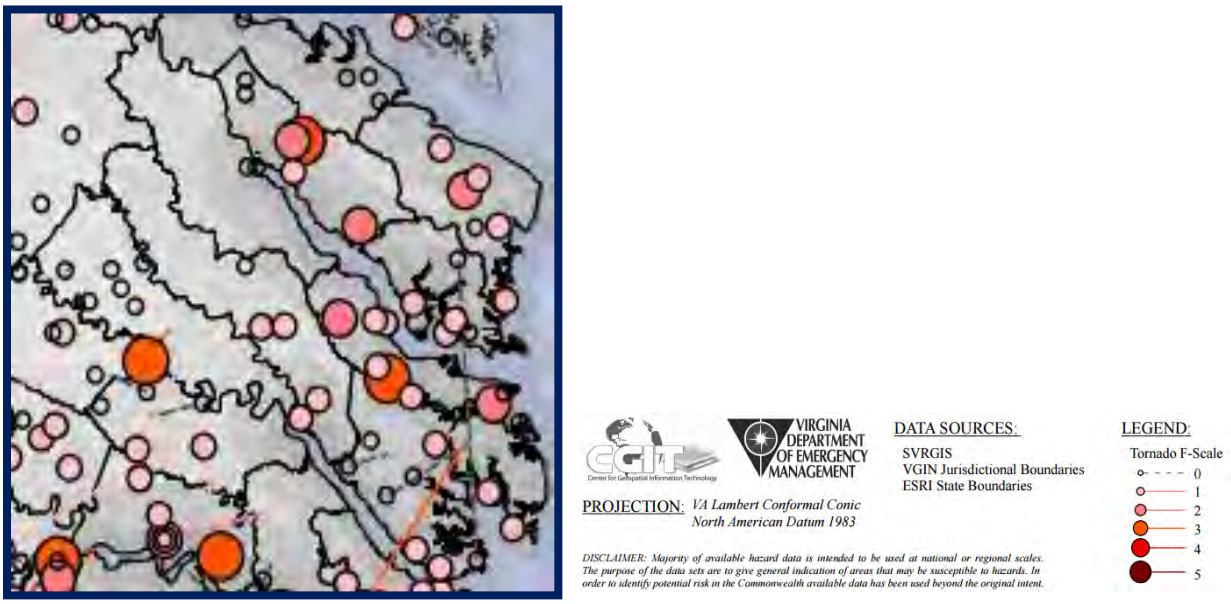
Table 13: Fujita Scale to measure tornados.

F #	Est. Wind (mph)	Typical Damage
F0	< 73	Light: chimneys damaged, shallow-rooted trees pushed over
F1	73-112	Moderate: mobile homes pushed off foundations, cars blown
F2	113-157	Considerable: mobile homes demolished, trees uprooted, roofs torn off frame houses
F3	158-206	Severe: roof and walls torn down, trains overturned, cars thrown
F4	207-260	Devastating: well-constructed walls leveled, large objects thrown
F5	261-318	Incredible: homes lifted and carried, cars thrown 300 ft, trees de-barked

Table 14: Fijita Scale, Derived Enhanced Fujita (EF) Scale and Operated EF Scale.

Fujita Scale			Derived EF Scale		Operational EF Scale	
F #	Fastest ¼ mile (mph)	3 Second Gust (mph)	EF #	3 Second Gust (mph)	EF #	3 Second Gust (mph)
0	40-72	45-78	0	65-85	0	65-85
1	73-112	79-117	1	86-109	1	86-110
2	113-157	118-161	2	110-137	2	111-135
3	158-207	162-209	3	138-167	3	136-165
4	208-260	210-261	4	168-199	4	166-200
5	261-318	262-317	5	200-234	5	Over 200

Figure 13: Historic Tornado Touchdowns and Tacks 1950-2011. HAZARD IDENFICATION: Historic tornado touchdowns and tracks are symbolized for visual effect and are not drawn to scale. Actual tornado swath widths vary considerably, although more intense tornadoes are generally wider.



The hot temperatures and humidity of the late afternoon fuel the thunderstorm's growth. If certain conditions are right, a tornado may develop. Hurricane-induced tornadic activity can also occur close to the coastline as a hurricane makes landfall (Watson, 2002). Virginia's tidewater counties see a fair number of tornadoes for two reasons, both of which are related to the region's proximity to Chesapeake Bay and the coast. For instance, as waterspouts are common, they will occasionally come onshore and have minimal damage. Once the waterspout comes onshore, it is considered a tornado and is generally classified as a F0. The second instance this area sees an increase in tornadoes is that often during the warm months there is a bay breeze or sea breeze front (bay or sea cooled air on one side of the front and land heated air on the other). When a large rotating thunderstorm moves over a boundary/front such as this, there is an increased chance that conditions will be right for the development of a tornado (Watson, 2002). Between 1950 and 2021, sixteen tornadoes were reported in Gloucester County, ten in Middlesex, seven in Mathews, seven in King and Queen County, three in Essex County, and eight in King William County (NCDC Storm Event Database, 2021). The Commonwealth of Virginia Hazard Mitigation Plan's illustration above shows historic tornado touchdowns within the Middle Peninsula (Figure 13). While the historic data appears to show that the Middle Peninsula has a low annual probability of being struck by a tornado, it is important to note that because tornadoes can result from severe thunderstorms and hurricanes, the susceptibility of this region to these storms carries the threat of tornadoes along with it. However, it's important to mention that the vulnerability will vary from locality to locality. This is clear when looking at Figure 15. Those localities within the closest proximity to the water seem to be more vulnerable whereas the upper localities (i.e. King William, King & Queen and Essex) are less vulnerable.

On April 16, 2011, three separate tornadoes touched down in the Middle Peninsula. The first tornado came from the southwest. The tornado took a 46-mile path that hit Surry, James City, York, Gloucester, and Mathews Counties. This tornado registered as a F3 tornado on the Fujita Scale which means that winds were 158-206 miles per hour (mph). Such winds severely damaged roofs and walls and threw cars. In Gloucester County alone this tornado tore the roof off Page Middle School and crumpled fences and buses on the property (Figure 14). Overall, this tornado caused approximately $8,020,000 in damages, caused 2

fatalities and 60 injuries. The second and third tornadoes touched down in Middlesex County. The second tornado registered as a FI tornado on the Fujita Scale. This path was 1.06 miles and caused approximately $100,000 in damages. The third tornado registered as a F2 tornado on the Fujita Scale. This path was 2.8 miles and caused approximately $6,000,000 in damages.

Figure 14: Photo of the damage at Page Middle School in Gloucester County (Gloucester-Mathews Gazette Journal, 2011).

Tornado Vulnerability

Weak tornadoes may break branches or damage signs. Damage to buildings (ie. mobile homes or weak structures) primarily affects roofs and windows and may include loss of the entire roof or just part of the roof covering and sheathing. Windows are usually broken from windborne debris.

In a strong tornado, some buildings may be destroyed but most suffer damage like loss of exterior walls or roof or both; interior walls usually survive.

Violent tornadoes cause severe to incredible damage, including heavy cars lifted off the ground and thrown and strong frame houses leveled off foundations and swept away; trees are uprooted, debarked, and splintered.

Weak tornadoes make up 74% of all tornadoes, and 67% of all tornado deaths come from violent tornadoes.

Tornado Extent (Impact)

In Virginia, tornadoes primarily occur from April through September, although tornadoes have been observed in every month. Low-intensity tornadoes occur most frequently; tornadoes rated F2 or higher

are very rare in Virginia, although F2, F3, and a few F4 storms have been observed. In comparison to other states, Virginia ranks 28th in terms of the number of tornado touchdowns reported between 1950 and 2006; Midwestern and Southern states ranked significantly higher.

4.3.2. Lightning

Virginia averages 35 to 45 thunderstorm days per year statewide (Watson, 2001). Thunderstorms are generally beneficial because they provide needed rain for crops, plants, and reservoirs. Thunderstorms can occur any day of the year and at any time of the day but are most common in the late afternoon and evening during the summer months. About five percent of thunderstorms become severe and can produce tornadoes, large hail, damaging downburst winds, and heavy rains causing flash floods. Thunderstorm can develop in less than 30 minutes, allowing little time for warning. All thunderstorms produce lightning, which can be deadly. The NWS does not issue warnings for ordinary thunderstorms nor for lightning. The NWS does highlight the potential for thunderstorms in the daily forecasts and statements. The VDEM suggests that the public be alert to the signs of changing weather, such as darkening skies, a sudden wind shift, and drop in temperature, and having a warning device such as NOAA Weather Radio.

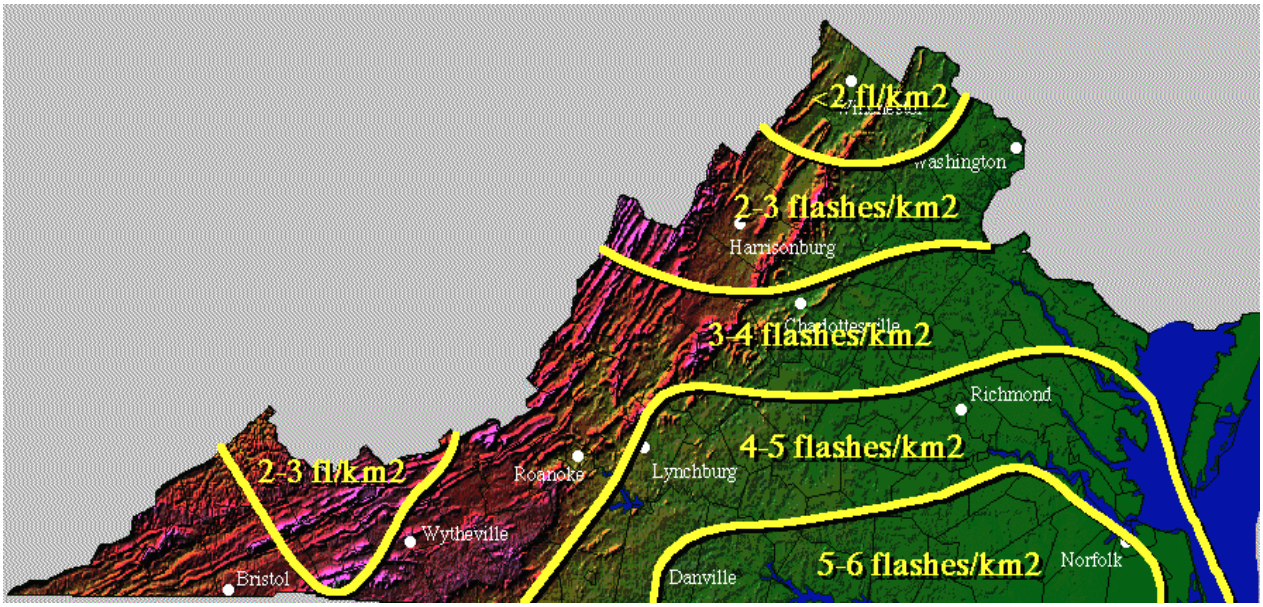


Figure 15: Lightning Flash Density Map computed for 1989 (Electric Power Institute) (University of Virginia Climatology Office, 1989).

Lightning can strike up to 10 to 15 miles from the rain portion of the storm. The lightning bolt originates from the upper part of the thunderstorm cloud known as the anvil. A thunderstorm can grow up to 8 miles into the atmosphere where the strong winds aloft spread the top of the thunderstorm cloud out into an anvil. The anvil can spread many miles from the rain portion of the storm, but it is still a part of that storm. Lightning, from the anvil, may strike several miles in advance of the rain. Lightning bolts may also come from the side or back of the storm, striking after the rain and storm have seemed to pass, or hitting areas that were totally missed by the rain.

Lightning Vulnerability

Between 1959 and 2017, lightning killed 67 people in Virginia. Many additional injuries from lightning go unreported or are not captured by NWS data collection techniques. Nationally, from 1959 through 2017, there have been 4136 deaths due to lightning. Most deaths were males between the ages of 20 and 40

years old who were caught outdoors on fishing, camping, boating, or farming /ranching. A national network of 114 lightning ground stroke detectors was put in place by the Electric Power Research Institute (EPRI), a private organization, that serves the needs of power companies and other subscribers interested in lightning across the country (Virginia Climate Advisory, 1992). These detectors sense the characteristic electromagnetic impulses of cloud-to-ground lightning strikes that occur up to several hundred kilometers away. Then, by using triangulation techniques, the network is able to describe the location of every ground strike that it detects in the continental U.S. (Figure 15). It's important to realize that the contours on the map are very general and because accurate, long-term records of lightning strikes do not exist, the illustration may not be representative of long-term patterns. Historic data shows that the Middle Peninsula region is at a low risk of suffering damages from lightning and thunderstorms, yet it is important to note that thunderstorms and lightning can be very dangerous and can accompany hurricanes and other severe weather events.

The entire planning area is equally at risk to lightning and can be dangerous and/or life threatening. It is hard to generate specific mitigation strategies for this potential natural hazard other than a general public awareness/education campaign associated with thunderstorm/lightning activity.

4.3.3. High Wind / Windstorms (excluding tornados and hurricanes)

High winds and windstorms, when not a result of hurricanes or tornadoes, are often associated with thunderstorms. The NWS defines a severe thunderstorm as having winds 50 kts (58 mph) or hail greater than ¾" in diameter (about dime-sized). A thunderstorm is considered severe if it produces hail larger than 3/4 of an inch (2 cm), winds greater than 58 mph (93 kph), or tornadoes. This strong frontal system could produce violent damaging effects to the community, such as hail, lightning, high winds (sometimes including tornadoes), and flash floods. Numerous thunderstorms occur in Middle Peninsula every year and vary amongst localities.

High Wind/Windstorms Vulnerability

The threat that any particular thunderstorm presents varies depending on its intensity, structure, and the ground below it. Many thunderstorms simply require people and their belongings to seek shelter inside a sturdy building. However, severe thunderstorms can be very dangerous and require seeking shelter underground because of the damage, they can cause to buildings. Historically the most severe occur during the spring and summer. In the U.S., only about 10% of all thunderstorms are classified as severe. Seeking shelter before a thunderstorm has arrived is best because high wind and lightning can form well in advance of any precipitation. Hail-resistant roofs can reduce property damage, as can properly attached roofs. As always, learning about what safety measures to take during a thunderstorm is the first and most important step in coping with thunderstorms.

In the U.S., the NWS issues severe thunderstorm watches and warnings. A watch is issued when atmospheric conditions are favorable for the development of a severe thunderstorm. A warning is issued when severe thunderstorms have developed. Similar to tornado watches and warnings, severe thunderstorm warnings are broadcast via media (ie. radio and television), Internet, and NOAA weather radios. Particularly of note for coastal communities, such as the Middle Peninsula, are wind advisories associated with water bodies. A Small Craft Advisory is issued for sustained winds 25-33 knots and/or Seas > 7 feet within 12 hours; There is no legal definition of "small craft" but the Coast Guard generally recommends boats smaller than 33 feet should avoid being on the water, but it depends on the experience of the crew. A Gale Warning is issued for 1-minute sustained surface winds in the range 34 kt (39 mph or 63 kph) to 47 kt (54 mph or 87 kph) inclusive, either predicted or occurring not directly associated with tropical cyclones. Reliable forecasting is essential to providing communities with adequate warnings about incoming thunderstorms and the specific threats that each storm possesses.

Damage from strong winds associated with thunderstorms can result in scattered, but severe damage to buildings and vegetation. Although these severe weather events usually occur during the spring and summer months, the emergency management staff should be prepared for them to occur at any time throughout the year.

Utilizing VDEM-generated information available on the state website and/or other information sources, community preparedness mitigation strategies should be developed by the localities for quick dissemination to their residents. Dissemination outlets should include jurisdictional websites, local radio, and TV stations as well as social media sites such as Facebook and twitter.

Derecho

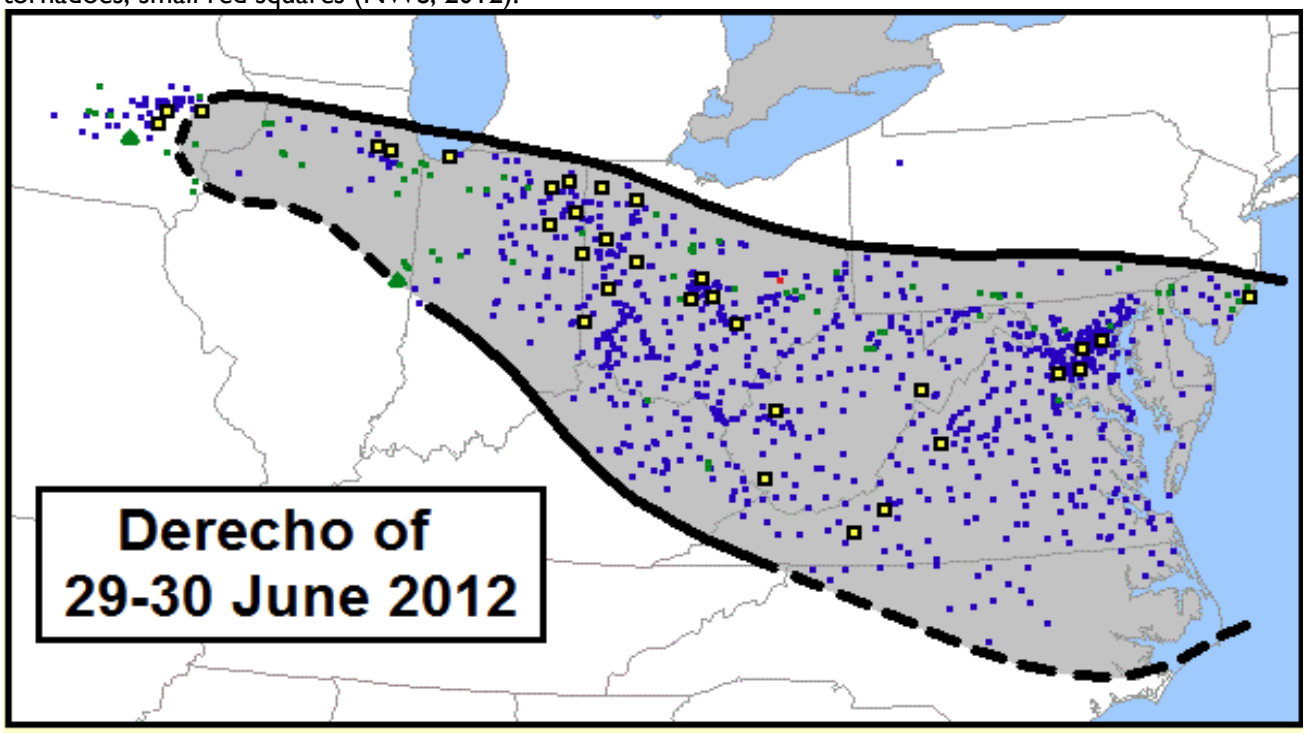
According to the NWS, a derecho is a complex of thunderstorms or a mesoscale convective system (MCS) that produce large swaths of severe, straight-line wind damage at Earth's surface. To be classified as a derecho, the following conditions must be met:

- There must be a concentrated area of convectively induced wind damage or gust greater than or equal to 58 mph occurring over a path length of at least 250 miles.
- Wind reports much show a pattern of chronological progression in either a singular swath (progressive; this event was a classic example) or a series of swaths (serial.
- There must be at least three reports separated by 64 kilometers (km) or more of Enhances Fujita (EFI) damage/or measured convective wind gusts of 74 mph or greater.
- No more than 3 hours can elapse between successive wind damage/gust events.

Derechos can occur year-round but are most common from May to August (Coniglio et al., 2004)

On June 29, 2012, a derecho struck the Ohio Valley and Mid-Atlantic states. The derecho traveled 700 miles, impacting 10 states and Washington, D.C. (Figure 16). The hardest hit states were Ohio, West Virginia, Virginia, and Maryland, and Washington, D.C. The winds generated by this system were intense, with several measured gusts exceeding 80 mph and causing the death of thirteen people due to falling trees. An estimated 4 million customers lost power for up to a week. The region impacted by the derecho was also in the midst of a heat wave. The heat, coupled with the loss of power, led to a life-threatening situation. Heat claimed 34 lives in areas without power. The Middle Peninsula experienced wind gusts ≥65 kts (74 mph).

Figure 16: Area affected (black contours) and storm reports (colored symbols) associated with the June, 29, 2012 derecho. Reports are for the 24-hour period from 7:00 a.m (Central Daylight Time (CDT)) Friday, June 29 to 7:00 a.m. CDT Saturday, June 30. Areal outline based in Iowa and Illinois to reflect the derecho's origin from convection in the region that did not immediately produce continuous derecho-like conditions. In addition, some of the report in those states occurred not with the system here discussed, but rather with a subsequent storm complex that formed on the evening of June 29. The areal outline also is dashed in North Carolina to reflect that many of the damaging wind gusts in the state occurred south of the thunderstorms that produced them. Storm reports depicted as follows. Wind damage or wind gust ≥ 50 kts (59 mph), small blue squares, estimated or measured with gusts ≥65 kts (74 mph), large black squares with yellow centers, hail ≥0.75 inches, small green squares, hail ≥2.0 inches, large green triangles, tornadoes, small red squares (NWS, 2012).



High Wind / Windstorms Extent (Impact)
Wind risk can be determined by measuring the speed of the winds. The categories used to determine risk and ranking hazards include the following:

Hurricane Risk	Wind Speed (mph)	Category
Low	≤59.9	High Wind
Medium – Low	60.0-73.9	Tropical Storm
Medium – High	74.0-94.9	Category 1 Hurricane
High	≥95.0	Category 2 +

4.3.4. Coastal/Shoreline Erosion

As flooding is the most frequent and costly natural hazard in the United States - besides fire, nearly 90% of Presidential Disaster Declarations result from natural events where flooding is a major component. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto adjacent floodplains and other low-lying land adjacent to rivers, lakes, ponds, and the Chesapeake Bay.

Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall. These conditions are produced by hurricanes during the summer and fall, and nor'easters and other large coastal storms during the winter and spring. Storm surges may overrun barrier islands and push sea water up coastal rivers and inlets, blocking the downstream flow of inland runoff.

Soil Erosion
Hurricanes and nor'easters produce severe winds and storm surges that create significant soil erosion along rivers and streams in the Middle Peninsula. In addition to the loss of soil along these water bodies, there is damage to man-made shoreline hardening structures such as bulkheads and rap-rap as well as to piers, docks, boat houses and boats due to significant storm surges.

These damages are more severe along the broad open bodies of water on major rivers located closer to the Chesapeake Bay. In general terms, the damage is less intense as you move up the watershed from the southeastern area of the region towards the northwestern end of the Middle Peninsula. Therefore, the soil erosion is most severe in Mathews, Gloucester, and Middlesex Counties and to a lesser degree in the 3 remaining Middle Peninsula Counties of King and Queen, King William, and Essex Counties.

The location and the angle at which these hurricanes/nor'easters come ashore region can significantly affect the amount of soil erosion during a particular storm. It can generally be said that hurricane generated soil erosion is uneven in occurrence and that the storm surge affords 2 opportunities for erosion – once as water inundates low-lying amount coast lands and again as floodwaters ebb.

For example, with Hurricane Isabel in 2003, its enormous wind field tracked in a north-northwest direction to the west of the Chesapeake Bay with the right front quadrant blowing from the south-southeast. This pushed the storm surge up the Bay and piling it into the western shore – causing serious soil erosion to the eastern land masses in Mathews, Gloucester, and Middlesex Counties.

Destructive as it was, Hurricane Isabel might have been worse. If it had been stronger at landfill, the storm surge generated in the Chesapeake Bay may have been higher. Had it stalled along its path and lingered through several tide cycles, prolonged surge conditions, exacerbated by high winds, might have cause more severe erosion. If rainfall has been higher, bank erosion due to slope failure might have been more common, particularly given the wetter than normal months that preceded Hurricane Isabel.

Coastal/Shoreline Erosion Vulnerability
Thousands of acres of crops and forest lands may be inundated by both saltwater and freshwater. Escape routes, particularly from barrier islands, may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts. Coastal flooding is very dangerous and causes the most severe damage where large waves are driven inland by the wind. Wind driven waves destroy houses, wash away protective dunes, and erode the soil so that the ground level can be lowered by several feet. Because of the coastal nature of the Middle Peninsula, the region is very susceptible to this type of flooding and resulting damage.

Coastal/Shoreline Erosion Extent (Impacts)
According to the US Geological Survey there are six physical variables that influence the coastal and its vulnerability to sea-level rise and inundation. Shoreline erosion is one of the variables considered in the following table. Shoreline erosion and accretion rates for the U.S. have been compiled by May and others (1983) and Dolan and others (1985) into the Coastal Erosion Information System (CEIS) (May and others, 1982). CEIS includes shoreline change data for the Atlantic, Gulf of Mexico, Pacific and Great Lakes coasts, as well as major bays and estuaries. The data in CEIS are drawn from a wide variety of sources, including published reports, historical shoreline change maps, field surveys and aerial photo analyses. However, the

lack of a standard method among coastal scientists for analyzing shoreline changes has resulted in the inclusion of data utilizing a variety of reference features, measurement techniques, and rate-of-change calculations. Thus, while CEIS represents the best available data for the U.S. as a whole, much work is needed to accurately document regional and local erosion rates.

	Ranking of coastal vulnerability index				
	Very low	Low	Moderate	High	Very high
VARIABLE	1	2	3	4	5
Geomorphology	Rocky, cliffed coasts Fiords Fiards	Medium cliffs Indented coasts	Low cliffs Glacial drift Alluvial plains	Cobble beaches Estuary Lagoon	Barrier beaches Sand Beaches Salt marsh Mud flats Deltas Mangrove Coral reefs
Coastal Slope (%)	> .2	.2 – .07	.07 – .04	.04 – .025	< .025
Relative sea-level change (mm/yr)	< 1.8	1.8 – 2.5	2.5 – 2.95	2.95 – 3.16	> 3.16
Shoreline erosion/ accretion (m/yr)	>2.0 Accretion	1.0 – 2.0	-1.0 – +1.0 Stable	-1.1 – -2.0	< - 2.0 Erosion
Mean tide range (m)	> 6.0	4.1 – 6.0	2.0 – 4.0	1.0 – 1.9	< 1.0
Mean wave height (m)	<.55	.55 – .85	.85 – 1.05	1.05 – 1.25	>1.25

4.3.5. Wildfire

A wildfire is an uncontrolled burning of grasslands, brush, or woodlands. The potential for wildfire depends upon surface fuel characteristics, recent climate conditions, current meteorological conditions, and fire behavior. Hot, dry summers, and dry vegetation increase susceptibility to fire in the fall, a particularly dangerous time of year for wildfire.

The three leading causes of wildfires in Virginia are escaped debris fires, arson, and machine use. Wildfires can also result from natural occurrences, such as lightning strikes. Wildfire danger can vary greatly season to season and is often exacerbated by dry weather conditions.

The VDOF indicates that there are three principal factors that can lead to the formation of wildfire hazards: topography, fuel, and weather. The environmental conditions that exist during spring (March and April) and fall (October and November) exacerbate the hazard. When relative humidity is low and high winds are coupled with a dry forest floor (brush, grasses, leaf litter), wildfires may easily ignite. Years of drought can lead to environmental conditions that promote wildfires. In Virginia, accidental or intentional setting of fires by humans is the largest contributor to wildfires. Residential areas that expand into wild land areas also increase the risk of wildfire threats.

Wildfire Vulnerability

As development has spread into areas which were previously rural, new residents have been relatively unaware of the hazards posed by wildfires and have used highly flammable material for constructing buildings. This has not only increased the threat of loss of life and property but has also resulted in a greater population of people less prepared to cope with wildfire hazards.

The impacts of wildfires can be widespread leading to many secondary hazards. During a wildfire, the removal of groundcover that serves to stabilize soil can lead to hazards such as landslides, mudslides, and flooding. In addition, the leftover scorched, and barren land may take years to recover, and the resulting erosion can be problematic.

Because of wildfire risk, the Virginia Department of Forestry (VDOF) has provided new information on identifying high-risk fire areas. Their Fire Risk Assessment Mapping Database was designed to help communities determine areas with the greatest vulnerability to wildfire. Since wildfire occurrence is based on multiple factors, the VDOF developed a fire ranking map to assist to wildfire prevention efforts, as shown in Figure 22. In 2002 and 2003, VDOF examined which factors influence the occurrence and advancement of wildfires and how these factors could be represented in a Geographic Information System (GIS) model. VDOF determined that historical fire incidents, land cover (fuels surrogate), topographic characteristics, population density, and distance to roads were critical variables in a wildfire risk analysis. The resulting high, medium, and low risk category reflect the results of these analyses. Figure 17 and Table 15 show the varying degree of risk amongst Middle Peninsula localities.

Figure 17: Middle Peninsula Wildfire Risk. Throughout the region risk to wildlife varies due to historic fire incidents, land cover, topographic, characteristics, population density and distance to roads.

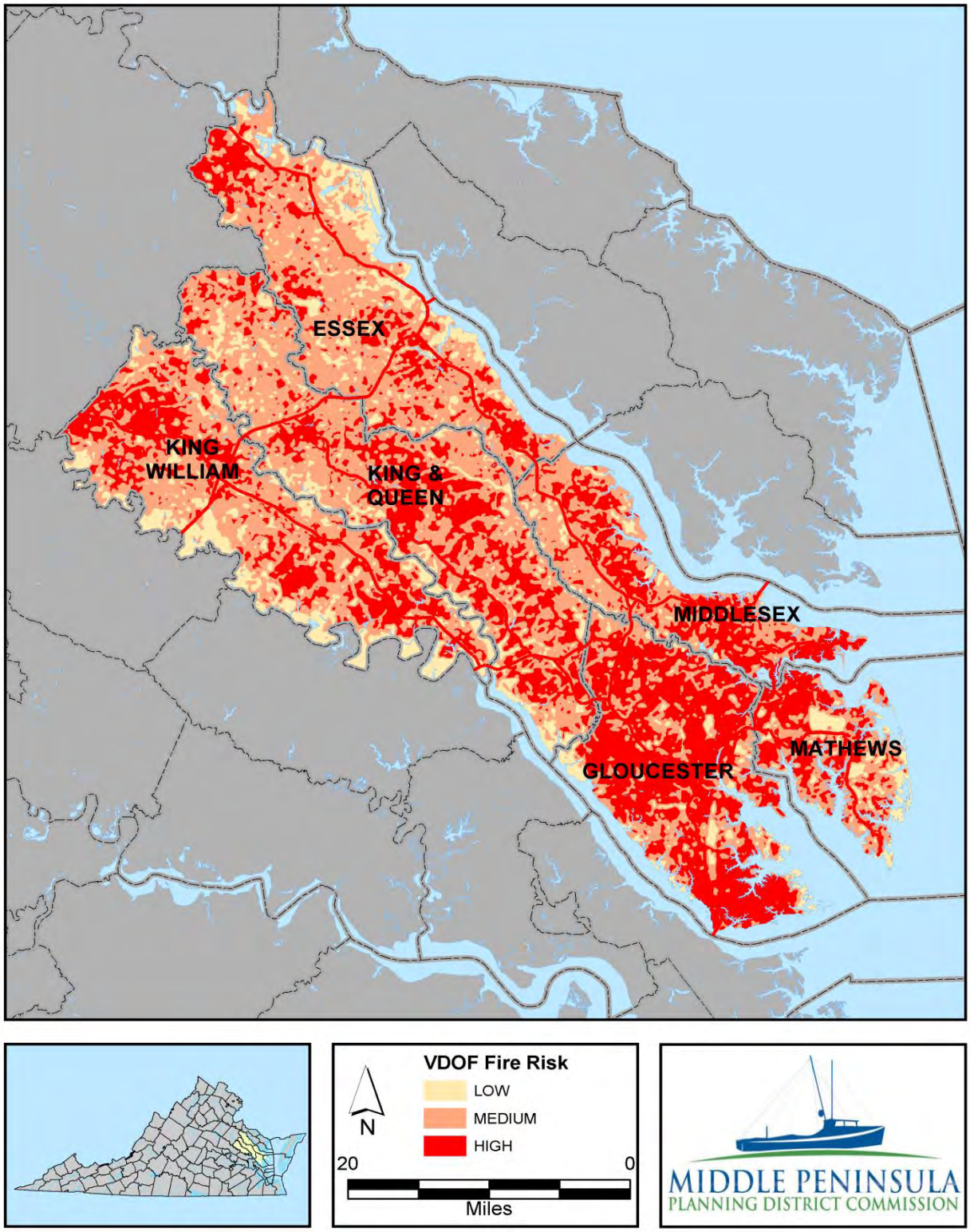


Table 15: Acres of each Middle Peninsula County within each VDOF Fire Risk Category.				
County	**LOW**	**MEDIUM**	**HIGH**	**Total Acreage**
Essex	33,894	105,885	31,999	171,778
Gloucester	16,267	46,195	90,182	152,644
King and Queen	28,569	117,897	59,440	205,906
King William	42,127	89,417	51,039	182,583
Mathews	14,903	28,819	21,966	65,688
Middlesex	8,619	50,251	33,320	92,190
Middle Peninsula Total	**144,389**	**438,464**	**287,946**	**870,789**

Table 16: Percent of each Middle Peninsula County's area within each VDOF Fire Risk Zone.			
County	**LOW**	**MEDIUM**	**HIGH**
Essex	19.7	61.6	18.6
Gloucester	10.7	30.3	59.1
King and Queen	13.9	57.3	28.9
King William	23.1	49.0	28.0
Mathews	22.7	43.9	33.4
Middlesex	9.3	54.5	36.1
Middle Peninsula	**16.6**	**50.4**	**33.1**

As a region, most of the area making up the Middle Peninsula falls within the "Medium" Fire Risk category (Table 15 and 16). It is noteworthy that nearly 60 percent of the area of Gloucester County falls within the "High" Fire Risk category (Table 16).

Debris burning continues to be the leading cause of forest fires in Virginia. The Commonwealth of Virginia has several laws that help to reduce the risk of wildfires. Most notably is the 'Virginia's 4:00 PM Burning Law', which goes into effect each spring. The 4:00 PM Burning Law is different from the burning bans, which are invoked only during periods of extreme fire danger. Briefly, the 4:00 PM Burning Law states: from February 15 through April 30 of each year, no burning before 4:00 PM is permitted if the fire is in, or within 300 feet of, woodland, brushland or fields containing dry grass or other flammable material.

Since forest fuels cure during the winter months, the danger of fire is higher in early spring than in summer when the forest and grasses are green with new growth. The 4:00 PM Burning Law is an effective tool in the prevention of forest fires.

Areas where homes meet the Wildland are called the Wildland/Urban interface. Flammable forest fuels often surround homes located in the woods. The VDOF suggests the following safety tips to minimize the threat to homes:

- Have a least 30 feet of defensible space surrounding a home. This will reduce the wildfire threat to a home by changing the characteristics of the surround vegetation. Defensible space also allows firefighters room to put out fires.
- Build with fire-resistant exterior construction materials, such as cement, brick, plaster, and stucco and concrete masonry. Double pane glass windows can make a home more resistant to wildfire heat and flames. Roofs should be Class A.
- Use landscaping materials and design to also create defensible space. Remove flammable plants that contain resins, oils and waxes that burn readily. Large, leafy hardwood trees should be pruned so that the lowest branches are at least 6 to 10 feet high to prevent a fire on the ground from spreading up to the treetops.

- Identify a home and neighborhood with legible and clearly marked street names and numbers so emergency vehicles can rapidly find the location of the emergency. Include a driveway that is at least 12 feet wide with a vertical clearance of 15 feet – provide access to emergency apparatus.

Between 2015 and 2020 there have been of 87 wildfires within the region (Appendix K). Based on VDOF records, each locality has been impacted by wildfire (Table 17 and 18):

Table 17: The number wildfires in a given year (VDOF, 2021).

County	Number of Wildfires in a Given Year						Total
	2015	2016	2017	2018	2019	2020	
Essex	2	3	4	6	5	1	21
Gloucester	6	5	3	3	4	3	24
King & Queen	1	3	5	4	1	4	18
King William	4	1	2	2	1	1	11
Mathews	0	3	1	1	1	1	7
Middlesex	1	2	0	2	0	1	6
Total	14	17	15	18	12	11	87

Table 18: The total acres burned at as result of wildfires in a given year (VDOF, 2021).

County	Number of Acres Burned in a Giver Year						Total
	2015	2016	2017	2018	2019	2020	
Essex	3.10	35.10	3.7	22.6	14.3	30	108.8
Gloucester	145	227.3	7.6	.4	42	108.7	531
King & Queen	16	6.3	9.8	34.2	1.5	74.4	142.2
King William	1.5	2.5	13.8	4	5	5.5	32.3
Mathews	0	2.8	3.3	3	1.8	.7	11.6
Middlesex	1	0.2	0	3.1	0	.2	4.5
Total	166.6	274.2	38.2	67.3	34.6	219.5	830.4

Previous wildfire events identified in the 2011 Mitigation Plan include:

- During 2009, Middlesex County experienced a major wildfire north of Urbanna between route 602 and US Route 17 near Hilliard Pond.

- During 2008, Gloucester County experienced a significant fire in the Guinea area that burned several acres. While this fire did not require any evacuations it did require mutual aid from other jurisdictions. This fire was coordinated through Abington Volunteer Fire and Rescue.

In 2008, drought conditions combined with strong winds resulted in sporadic wildfires in numerous locations throughout the Middle Peninsula region. Mutual aid assistance between area fire departments, as well as from the VDOF, was widely used during these wildfire events.

Mitigation strategies formalizing MOUs between area fire departments to quickly respond to the adverse effects of the wildfire hazard should be included as part of the AHMP update.

Mitigation strategies to improve communication systems between the local jurisdictions and with their state fire-fighting partners should also be proposed with this update.

In addition, the VDOF safety tips - as noted above - lend themselves to a public education mitigation strategy dealing with wildfires and should be included with this update.

Wildfire Extent (Impact)
The VDOF thoroughly tracks the number of acres burned and estimated damages for each incident in the Commonwealth. Timing and coordination resulted in limitations in using this data as part of the ranking methodology.

4.3.6. HAZMAT

HAZMAT can be defined as a material (Chemical, Radiological, Biological or Reactive) that would be a danger to life or to the environment if released without precautions. Furthermore, a hazardous material is any substance or material in a quantity or form that may pose a reasonable risk to health, the environment, or property. The hazards and associated risks of hazardous materials will vary amongst Middle Peninsula as it includes incidents involving substances such as toxic chemicals, fuels, nuclear wastes and/or products, and other radiological and biological or chemical agents. In addition to accidental or incidental releases of hazardous materials due to fixed facility incidents and transportation accidents, regions must be ready to respond to hazmat releases as potential terrorism. It is important to note that the risk of a Hazmat incident is unpredictable and will vary amongst Middle Peninsula localities.

According to VDEM, all jurisdictions in Virginia have a Local Emergency Planning Committee (LEPC) that identifies local industrial hazardous materials and keeps the community informed of the potential risks. With a fixed facility, the hazards are pre-identified, and the facility is required to prepare a risk management plan and provide a copy of this plan to local governments.

Hazardous materials carried through Middle Peninsula localities by commercial vehicle may also cause a risk, particularly if the vehicle is involved in an accident. While the vehicle should have placards on the vehicle to identify the hazard on board, however they are less predictable. In accordance with 9VAC20-110 the Virginia Waste Management Board is responsible for promulgating regulations governing the transport of hazardous materials within the Commonwealth. Additionally, the VAC also provides requirements for "every person who transports or offers for transportation of hazardous materials within or through the Commonwealth of Virginia" (9VAC20-110-110) Therefore there are measures in place to help reduce the risk of hazards materials being transported through the Middle Peninsula Region.

HAZMAT Vulnerability
The effects of hazardous materially is ultimately dependent on the type and amount of hazardous material, however injuries and/or deaths could occur as a result of a hazmat incident. They can pose risk to health, safety, and property at fixed facilities and during transportation. According to VDEM, "A business might have to evacuate depending on the quantity and type of chemical released or local officials might close a facility or area for hours, possibility days until a substance is properly cleaned up. Businesses that store, produce or transport hazardous materials may be fined for accidental or intentional spills. The business involve in the release would typically be responsible for the cost of the cleanup. A business that is located near the site of the hazardous waste site of a hazardous materials spill or release is likely to be unaffected unless the substance is airborne and poses a threat to areas outside the accident site. In that case local emergency official would order an immediate evaluation of areas that could potentially be affected. Depending on the type of hazardous substance, it could take hours or days for emergency official to deem the area safe for return." Ultimately this would impact business productivity and could impact the local/regional economy.

HAZMAT Extent (Impact)

Hazardous materials are categorized into nine major hazard classes that communicated the risk associated with it. Table 19 shows categories and provides examples of the hazardous material.

Table 19: Hazardous material are divided into 9 categories (VDEM, 2013).

CLASS	Division	NAME OF CLASS OR DIVISION	EXAMPLE
1	1.1 1.2 1.3 1.4 1.5 1.6	Explosives (mass detonation) Projections Hazards Mass Fire Hazards Minor Hazards Very Insensitive Extremely Insensitive	Dinitrophenol Ammunition Smoke, White Phosphorous Article, Explosive No. 5 Fireworks Blasting Agents Explosive, Blasting, Type E Article, Explosive Extremely Insensitive
2	2.1 2.2 2.3	Flammable Gases Non-Flammable Gases Poisonous/Toxic Gases	Propane Helium, Compressed Fluorine, Compressed
3		Flammable Liquids	Gasoline, Alcohol, Diesel Fuel, Fuel Oils
4	4.1 4.2 4.3	Flammable Solids Spontaneously Combustible Dangerous when wet	Ammonium Picrate, Wetted Phosphorus, White Dry Sodium
5	5.1 5.2	Oxidizers Organic Peroxides	Ammonium Nitrate, Liquid Organic Peroxide Type B, Liquid
6	6.1 6.2	Poisons (Toxic Material) Infectious Substance	Potassium Cyanide Diagnostic Specimen
7		Radioactive	Uranium, Plutonium
8		Corrosives	Hydrochloric Acid, Battery Acid, Formaldehyde, Sulfuric Acid
9		Miscellaneous Hazardous Materials	Asbestos, Airbag Inflaters
None		ORM-D (Other Regulated Material – Domestic)	Consumer Commodity (Hair Spray or Charcoal)
Combustible Liquid		Combustible Liquid	Heating Oil, Diesel Fuel

In addition to the categories of hazardous material, when shipping hazardous material driver must keep shipping papers and use the following to identify that they have hazardous material on board:

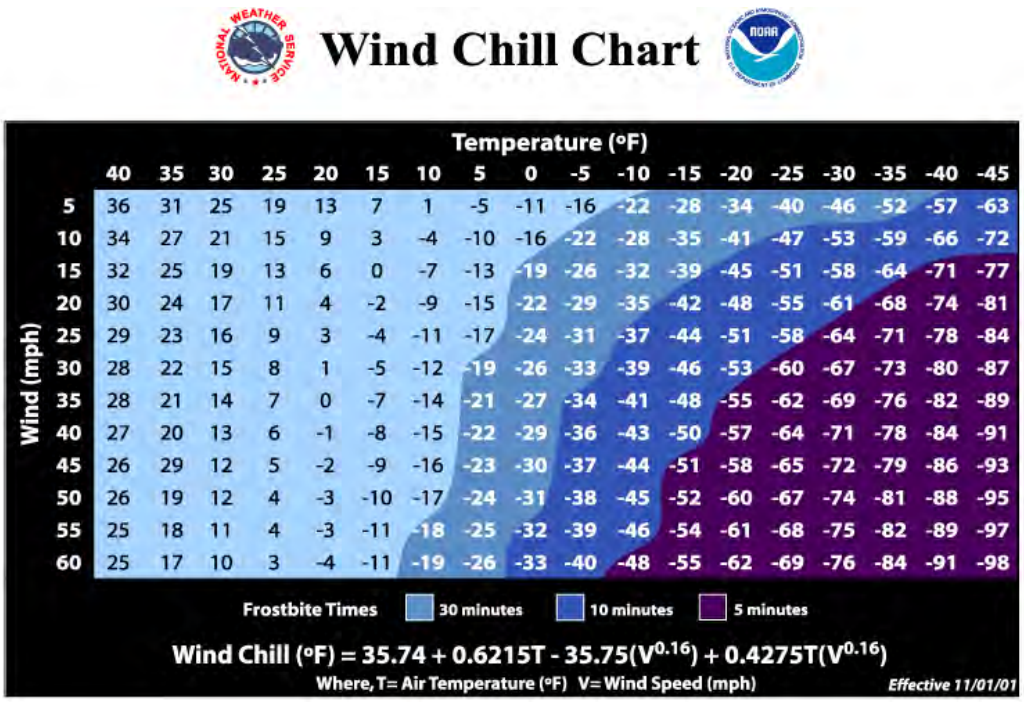
Package labels are diamond-shaped hazard warning labels found on most hazardous materials packages. These labels inform others of the hazard. If the diamond label does not fit on the package, shippers may put the label on a tag attached to the package. For example, compressed gas cylinders often have tags or decals. Global harmonization has standardized "Pictograms" which are also very prevalent on shipping labels and shipping papers to warn of potential hazards associated with the package contents.

Placards warn others of hazardous materials. They are placed on the outside of the vehicle and identify the hazard class of the cargo. A placarded vehicle must have at least four identical placards. Placards must be readable from all four directions. Therefore, they are put on the front, rear and both sides of the vehicle. Placards measure 10 ¾ inches square and are turned in a diamond shape. Cargo tanks and other bulk packaging display the identification number of their contents on placards. Or they may use orange panels or white diamond-shape displays the same size as placards.

4.3.7. Extreme Temperatures (Heat and Cold)

Extreme cold temperatures are not annual events in Virginia. Although wind chill advisories are issued nearly every year, especially in the western and northern portions of the state, life-threatening extreme cold, requiring wind chill warnings, is a rare occurrence in the Middle Peninsula. According to NOAA, Wind Chill is a term used to describe what the air temperature feels like to the human skill due to the combination of cold temperatures and winds blowing on exposed skin. Figure 18 shows the wind chill calculator.

Figure 18: Wind Chill Chart (NOAA, 2022).

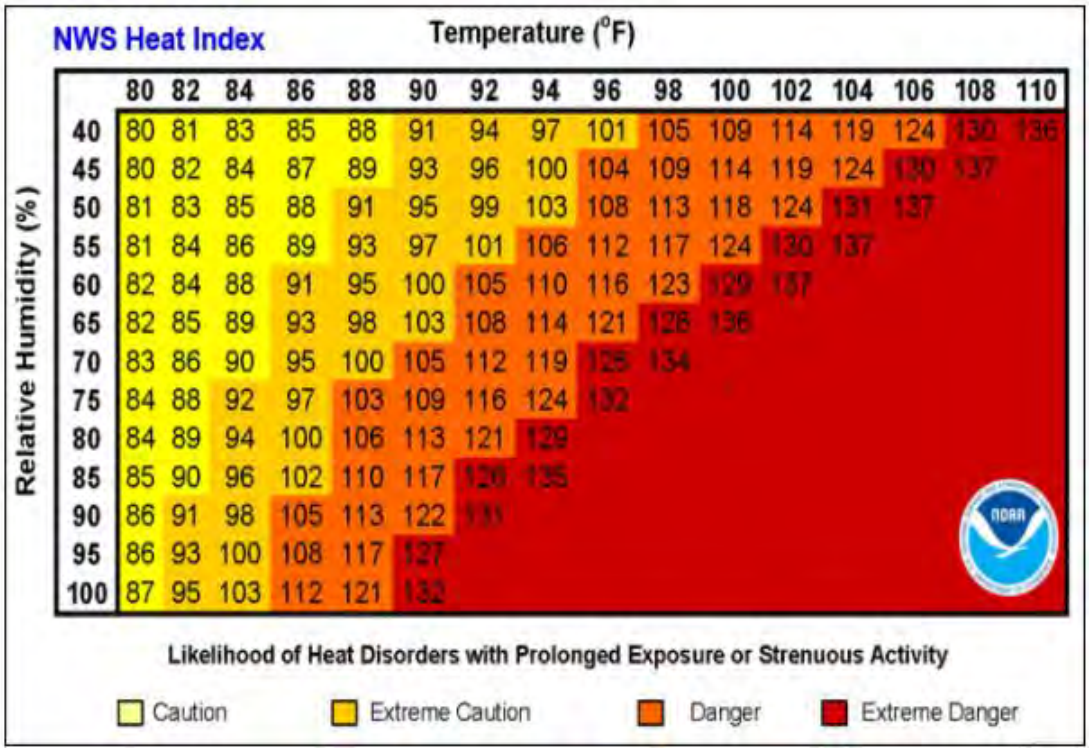


The NWS Wind Chill Temperature index uses advances in science, technology, and computer modeling to provide an accurate, understandable, and useful formula for calculating the dangers from winter winds and freezing temperatures. In early summer of 2001, Human trials were conducted at the Defense and Civil Institute of Environmental Medicine in Toronto, Canada. The trial results were used to improve the accuracy of the new formula and determine frostbite threshold values. During the human trials, twelve volunteers (six men and six women) were placed in a chilled wind tunnel and thermal transducers were stuck to their faces to measure heat flow from the cheeks, forehead, nose and chin while walking 3 mph on a treadmill. Each Volunteer participated in four trials of 90 minutes each and was exposed to varying wind speeds and temperatures. The new wind chill index is now being used in Canada and the United States.

The frequency of occurrence is dependent entirely upon the extreme cold criteria used - wind chill vs. air temperature. The primary impact of extreme cold is increased potential for frostbite, hypothermia, and potentially death because of over-exposure to extreme cold. Some secondary impacts of extreme/excessive cold may present a danger to livestock and pets, and frozen water pipes in homes and businesses.

Extreme heat, generally associated with drought conditions, is a phenomenon that is generally confined to the months of July and August, although brief periods of excessive heat have occurred in June and September. Extreme heat can be defined either by actual air temperature, or by the heat index, which relates the combined effects of humidity and air temperature on the body (Figure 19).

Figure 19: Heat Index Chart (NOAA, 2022).



Extreme heat is not an annual event in the Middle Peninsula. Although heat advisories are issued near every year, especially in the urban areas of Northern Virginia and Richmond. Life-threatening extreme heat is a rare occurrence in the Middle Peninsula region. The frequency of occurrence is dependent entirely upon the extreme heat criteria used (i.e. heat index vs. air temperature). The primary impact of extreme heat is increased potential for heat exhaustion or heat stroke, which can be fatal to the elderly and infirmed. In addition, there is an increased risk of dehydration, if proper steps are not taken to ingest adequate amounts of non-alcoholic fluids. The impact of extreme heat is most prevalent in urban areas, which are not found in the Middle Peninsula. Secondary impacts of excessive heat are severe strain on the electrical power system, and potential brownouts or blackouts.

The entire planning area is equally at risk to extreme temperature events.

4.4. Hazards Considered "Critical" Hazards to the Middle Peninsula

The following sections describe hazards that are common throughout the Middle Peninsula region and deemed "Critical Hazards" to the Middle Peninsula by the LPT.

4.4.1. Summer Storms

Summer Storms are weather systems accompanied by strong winds, lightning, heavy rain, and possibly hail and tornadoes. They can occur at any time in the Middle Peninsula of Virginia, although they are most frequent during the warm spring and summer months from April through September. The most common summer storm is the thunderstorm, with the severe thunderstorm with the most potential to cause damage. The potential thunderstorm threat is often measured by the number of "thunderstorm days" – defined as days in which thunderstorms are observed.

Thunderstorms form when a shallow layer of warm, moist air is overrun by a deeper layer of cool, dry air. Cumulonimbus clouds, frequently called "thunderheads," are formed in these conditions. These clouds are often enormous (up to six miles or more across and 40,000 to 50,000 feet high) and may contain tremendous amounts of water and energy. That energy is often released in the form of high winds, excessive rains, lightning, and possibly hail and tornadoes.

Thunderstorms are typically short-lived (often lasting no more than 30-40 minutes) and fast moving (30-50 miles per hour). Strong frontal systems, however, may spawn one squall line after another, composed of many individual thunderstorm cells. Severe thunderstorms may also cause severe flood problems because of the torrential rains that they may bring to an area. Thunderstorms sometimes move very slowly and can thus dump a tremendous amount of precipitation onto a location. Flooding can result, including flash floods, "urban flooding," and river flooding.

The entire planning area is equally at risk to summer storms.

4.4.2. Winter Storms (Ice & Snow)

4.4.2-1 Ice Storms

Virginia's biggest winter storms are the great "Nor'easters". At times, Nor'easters have become so strong that they have been labeled the "White Hurricane". In order for these storms to form, several things need to occur. High pressure builds over New England. Arctic air flows south from the high center into Virginia. The colder and drier the air is, the denser and heavier it becomes. This cold, dry air is unable to move west over the Appalachian Mountains and it remains trapped to the east side, funneling down the valleys and along the coastal plain toward North Carolina. To the east of the arctic air is the warm water of the Gulf Stream. The contrast of cold air sinking into the Carolinas and the warm air sitting over the Gulf Stream creates a breeding ground for storms. Combine this with the right meteorological conditions such as the position of the jet stream, and storm development may become "explosive" (sudden, rapid intensification; dramatic drop in the central pressure of the storm) (Watson and Sammler, 2004) (Figure 20).

Winter Ice Storms occur generally as freezing rain, when precipitation, starts falling as snow, melts as it passes through a warm layer of air several thousand feet above the ground. Beneath the warm layer of air is a shallow layer of freezing air just above the ground. As the liquid precipitation falls through this layer of freezing air, it becomes super-cooled, meaning that its temperature falls below freezing, but it remains a liquid. Before it has a chance to freeze solid (into sleet or ice pellets), the super-cooled liquid droplets hit the ground (or some object such as a tree limb or power line), whose temperature is also below freezing; the water then freezes on contact.

For a good Nor'easter to develop, the jet stream entering the West Coast of the United States splits. The northern branch crosses the northern Rockies and Canada while the southern branch dips to cross the Gulf Coast states, where it picks up a disturbance that it carries northeast across Virginia to rejoin the northern branch over Newfoundland. The northern branch of the jet supports the southward sinking cold air. When this disturbance interacts with the temperature boundary formed by the warm Gulf Stream waters and the arctic air mass inland, a low-pressure system forms. The strong wind from the northeast gives the low-pressure storm its name, *Nor'easter*. Wind blowing counterclockwise around the storm center carries warm, moist air from the Gulf Stream up and over the cold inland air. The warm air rises and cools, and snow begins. The storm's speed and exact track to the north become critical in properly forecasting and warning for heavy snow across Virginia. On the Middle Peninsula, it is quite common for the rain-snow line to fall right over the northern sections of King William, King and Queen, and Essex Counties. Heavy snow often falls in a narrow 50-mile-wide path about 150 miles northwest of the low-pressure center. Closer to the low's center, the warmer ocean air changes the precipitation to sleet, freezing rain and eventually rain. If the forecasted storm track is off by just a little bit, it may mean - 64 - the

difference between forecasting heavy rain, freezing rain or sleet, and a foot of snow (Watson and Sammler, 2004). Therefore, Middle Peninsula localities will not experience winter ice storms the same.

Intense winds around the storm's center build waves that rack the coastline and sometimes drive water inland, causing extensive coastal flooding and severe beach erosion. Unlike a hurricane, which usually comes and goes within one tidal cycle, the Nor'easter can linger through several tides, each one piling more water on shore and into the bays. The March 5-9, 1962, Nor'easter, known as the "Ash Wednesday Storm", lingered off the Virginia Capes for days. It caused over $200 million (in 1962 dollars) in property damage and major coastal erosion from North Carolina to Long Island, N.Y.

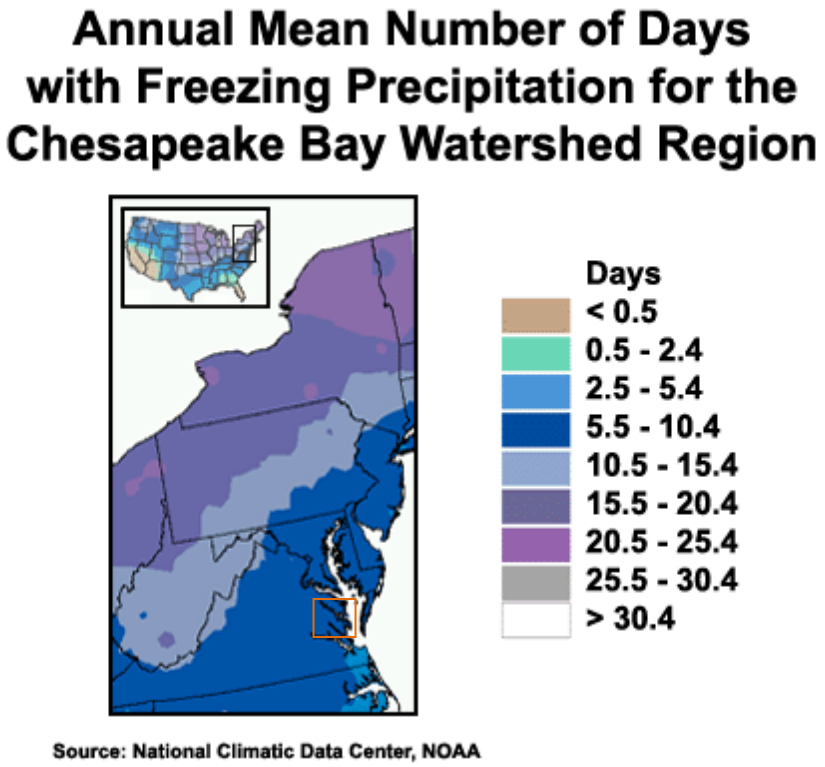


Figure 20: Annual mean number of days with freezing precipitation (rain or drizzle) for the Chesapeake Bay Watershed region. The area encompassing the Middle Peninsula is highlighted on the map with a red square.

As with snow, the frequency with which freezing rain occurs varies throughout the Chesapeake Bay watershed. In the northern part of the watershed, around Binghamton, NY, the incidence of freezing rain is one of the highest in the country. Although less common, freezing rain is still a threat even to the southern parts of the watershed. Figure 25 shows how the number of days with freezing precipitation (both rain and drizzle) in an average year varies throughout the Chesapeake Bay region. The Middle Peninsula generally experiences between 5.5 and 10.4 days of freezing rain annually. During the winter of 1993-1994, a series of ice storms struck Virginia. The conditions for the formation of an *ice storm* are not completely unlike those for the formation of a Nor'easter. High pressure over New England funnels cold, dry arctic air south over the state. The air tries to push west but cannot rise over the - 65 - Appalachian Mountains and becomes trapped on the east side. A storm moves northeast from the southern plains or Gulf Coast region. Instead of passing south and east of Virginia, it often moves up the western slopes of the mountains. As this warm, moist air rises over the mountains and the trapped cold air on the east side, precipitation begins (Watson and Sammler, 2004) (Figure 21). The type of precipitation depends on the depth of the

cold air. At first the thickness of the 3cold air mass is often enough to produce snow, but as the warm air passes over the cold air and erodes it, the cold air mass gets more and more shallow. Soon the cold air mass is too thin to produce snow. Rain droplets freeze into small ice pellets, or *sleet*, as it falls through the cold air. When sleet hits the ground, it bounces and does not stick to objects (Watson and Sammler, 2004).

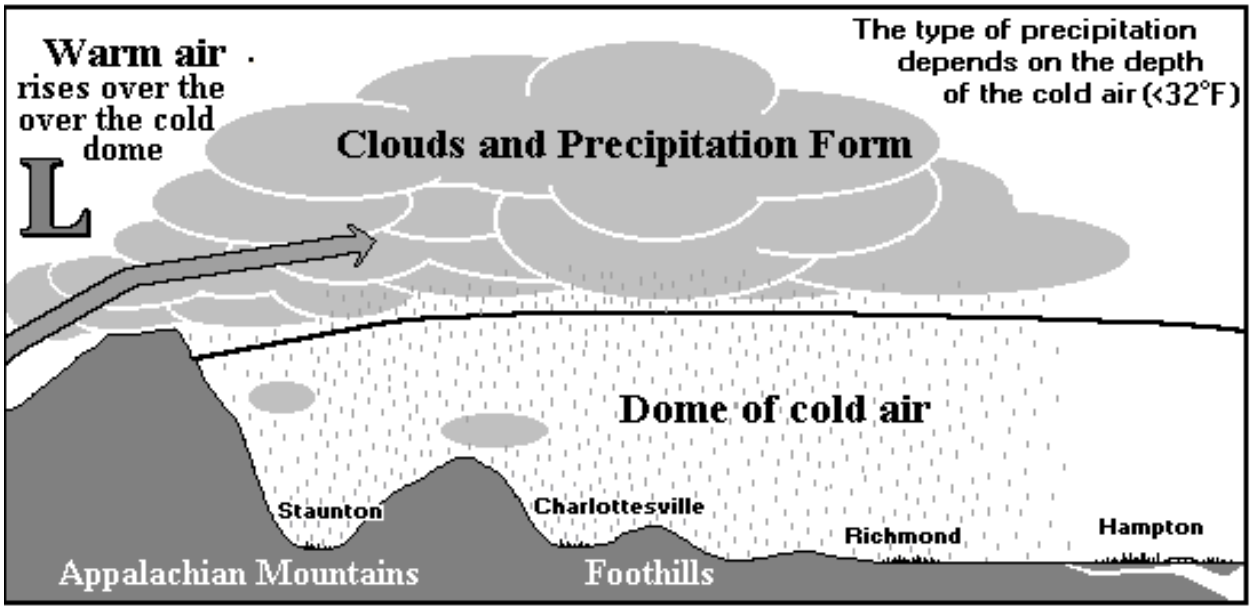


Figure 21: Ice Storm-Formation *(Watson and Sammler 2004).*

Eventually, the cold air mass is so shallow that the rain does not freeze. If the temperature of the earth's surface is below freezing, then rain will freeze as it hits the ground, producing *freezing rain*, a very dangerous on roadways or walkways. As the ice accumulates on trees and wires, the weight eventually causes them to break, knocking out power and phone service. Sometimes, so much ice can accumulate that structural damage and collapse can occur to buildings and communication towers. This is precisely what occurred during the "Christmas Ice Storm" of December 1998, which hit southeast Virginia, including the Middle Peninsula. Icy conditions caused injuries from slips, falls, and numerous vehicle accidents. Ice accumulations of up to an inch brought down trees and power lines. Outages were so widespread (400,000 customers on Christmas Eve) that some people were without power for up to ten days (Watson and Sammler, 2004). Other types of weather systems generally do not cause major problems for Virginia. Storms such as the "*Alberta Clipper*," a fast-moving storm from the Alberta, Canada region, or a cold front sweeping through from the west generally do not bring more than one to four inches of snow in a narrow 50- to 60-mile-wide band. Sometimes, the high pressure and cold arctic air that follow in the wake of a clipper become the initial set up for a Nor'easter. In very rare cases, elements combine to produce very localized heavy snow without any fronts or storm centers nearby. These events are nearly impossible to forecast with any accuracy (Watson and Sammler, 2004).

However, in November 2009, Tropic Storm Ida made landfall in Alabama, but weakened, losing its tropical storm characteristics, as it crossed to North Carolina. The storm redeveloped off the coast of Carolina in the Atlantic Ocean. The resulting coastal low combined with an unusually strong Canadian high over New England resulted in a strong pressure gradient over Coastal Virginia and the Carolinas. This caused storming northeasterly winds, high waves and record high water levels. Stations of the coastline of the Virginia recorded wind speeds, gusts, and barometric pressures of this Nor'easter (Table 20).

Table 20: Maximum observed wind speeds, gusts and barometric pressure by stations located near Middle Peninsula Localities during the November 2009 Nor'easter.

Station Name	Maximum Wind Speed			Maximum Wind Gust			Minimum Barometric Pressure	
	Date & Time (GMT)	m/s*	Kt**	Date & Time (GMT)	m/s	Kt	Date & Time (GMT)	mb***
Kiptopeke, VA	11/13 00:00	14.7	29	11/12 21:12	22.3	43	n/a	n/a
Lewisetta, VA	11/12 00:00	12.3	24	11/12 21:30	19.5	38	11/12 8:24	1006.7
Yorktown USCG Training Center, VA	11/12 23:06	21.4	42	11/12 23:12	25.9	50	11/12 23:06	1001.5
Chesapeake Bay Bridge Tunnel, VA	11/12 22:42	26.6	52	11/13 4:24	33.4	65	11/12 4:24	997.0

* 1 m/s (meters/second) = 2.2 miles per hour (mph) = 1.9 knots
** 1 kt (knot) = 1.2 mph = 0.05 m/s
*** mb (millibar) = 0.03 inches

Winter Ice Storms Vulnerability

Winter ice storms can impact individuals, property as well as the overall community. At the individual level ice has the potential to cause automobile accidents and reduce the walkability of community due to ice-covered walkways. Personal property may be impacted as pipes freeze or structural failures occur due to the weight of the ice. The overall community may also be impacted as transportation will be interrupted or halted, and the weight of ice to snap tree limbs could damage power lines or infrastructure.

Winter Ice Storm Extent (Impact)

While a winter ice storm may be measured based the damages caused by the ice storm, wind speed and the barometric pressure, winter ice storms may also be measure on the Sperry-Piltz Ice Accumulation Index (2009). This scale can predict the projected footprint, total ice accumulation and the resulting potential damages from approaching ices storms (Table 21).

Table 21: The Sperry-Piltz Ice Accumulation Index, or "SPIA Index". The below categories of damages are based upon combinations of precipitation totals, temperatures and wind/speeds/directions (SPIA, 2009).	
ICE DAMAGE INDEX	**DAMAGE AND IMPACT DISCRIPTIONS**
0	Minimal risk of dame to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
2	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
3	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1-5 days
4	Prolonged and widespread utility interruptions with extensive damage to main distribution feeder lines and some high voltage transmission lines/structures. Outages lasting 5-10 days.
5	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.

4.3.2-2 Snowstorms

The winter months can bring a wide variety of hazards to the Middle Peninsula, including blizzards, snowstorms, ice, sleet, freezing rain, and extremely cold temperatures. All of these weather events can be experienced throughout the state, depending on the depth of cold air that is in place over the region when the storm event comes. The Middle Peninsula's biggest winter weather threats come from Northeasters or Nor'easters. These large storms form along the southern Atlantic coast and move northeast into Virginia along the Mid-Atlantic coast. These events are explained in detail in the following section describing Critical Hazards to the Middle Peninsula, under the sub-heading "Winter Ice Storms". Winter storm events can bring strong winds and anything from rain to ice to snow to even blizzard conditions over a very large area. This combination of heavy frozen precipitation and winds can be quite destructive and lead to widespread utility failures and high cleanup costs. Nor'easters may occur from November through April, but are usually at their worst in January, February, and March.

Snowstorm Vulnerability

The impacts of winter storms are minimal in terms of property damage and long-term effects. The most notable impact from winter storms is the damage to power distribution networks and utilities. Severe winter storms with significant snow accumulation have the potential to inhibit normal functions of the Middle Peninsula. Governmental costs for this type of event are a result of the needed personnel and equipment for clearing streets. Private sector losses are attributed to lost work when employees are unable to travel. Homes and businesses suffer damage when electric service is interrupted for long periods. Health threats can become severe when frozen precipitation makes roadways and walkways very slippery

and due to prolonged power outages and if fuel supplies are jeopardized. Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or when trees fall due to excessive ice accumulation on branches. The primary impact of excessive cold is increased potential for frostbite, and potentially death as a result of over-exposure to extreme cold. Some secondary hazards extreme/excessive cold present is a danger to livestock and pets, and frozen water pipes in homes and businesses.

Snowstorms do not occur every year in the Middle Peninsula. The West Virginia University Extension Service developed estimates the likelihood for snowfall frequency and accumulation for 152 monitoring stations across the Commonwealth based on historic snowfall accumulation and frequency data (Rayburn and Lozier 2001, these data are available on-line at: http://www.wvu.edu/~agexten/forglvst/VAsnow/index.htm). Three of these stations are located on the Middle Peninsula: Urbanna in Middlesex County, Walkerton in King and Queen County, and West Point in King William County. While the other counties of the Middle Peninsula were not included in the West Virginia University Extension Office data, these stations may be considered representative to predict annual snow cover likelihood for the rest of the Middle Peninsula.

At the Urbanna Station in Middlesex County, snow cover data was collected for 24 years between 1949 and 1973. Based on snowfall frequency and accumulation during this period, a general risk of snow cover and snow depth in a given year was calculated. Rayburn and Lozier determined that there is a 50% risk of having between 1 and 8 inches of snow on the ground for 8 days or more. This means that, in one (1) year out of two (2), Urbanna will probably have snow of up to 8 inches on the ground for 8 days. In one (1) year out of four (4), Urbanna may have snow cover up to 8 inches deep for 12 days (in other words, there is a 25% chance of having snow for 12 days). In one year out of ten, Urbanna may have up to 8 inches of snow for 17 days (there is a 10% chance of having snow for 17 days). For deeper accumulations (greater than 8 inches), there is a 10% risk of having snow cover for 2 days or more. This means that, in 1 year out of 10, this location probably will have snow cover of at least 8 inches for 2 days.

At the Walkerton Station in King and Queen County, snow cover data was collected for 66 years between 1931 and 1997. Based on snowfall frequency and accumulation during this period, a general risk of snow cover and snow depth in a given year was calculated. Rayburn and Lozier determined that there is a 50% risk of having between 1 and 8 inches of snow on the ground for 6 days or more. This means that, in one year out of two, Walkerton will probably have snow of up to 8 inches on the ground for 6 days. In one year out of 4, Walkerton may have snow cover up to 8 inches deep for 13 days (in other words, there is a 25% chance of having snow for 13 days). In one year out of ten, Walkerton may have up to 8 inches of snow for 22 days (there is a 10% chance of having snow for 22 days). For deeper accumulations (greater than 8 inches), the risk is the same as reported for Urbanna and there is a 10% risk of having snow cover for 2 days or more. This means that, in 1 year out of 10, this location probably will have snow cover of at least 8 inches for 2 days. The average annual snowfall for 2014 at the Walkerton Station was 10.0 inches.

At the West Point station in King William County, snow cover data was collected for 44 years between 1953 and 1997. Based on snowfall frequency and accumulation during this period, a general risk of snow cover and snow depth in a given year was calculated. Rayburn and Lozier determined that there is a 50% risk of having between 1 and 8 inches of snow on the ground for 8 days or more. This means that, in one year out of two, West Point will probably have snow of up to 8 inches on the ground for 8 days. In one year out of 4, West Point may have snow cover up to 8 inches deep for 15 days (in other words, there is a 25% chance of having snow for 15 days). In one year out of ten, West Point may have up to 8 inches of snow for 19 days (there is a 10% chance of having snow for 19 days). For deeper accumulations (greater than 8 inches), the risk is the same as reported for both Urbanna and Walkerton. There is a 10% risk of having snow cover for 2 days or more. This means that, in 1 year out of 10, this location probably will

have snow cover of at least 8 inches for 2 days. The average annual snowfall for 2014 at the West Point Station was 10.1 inches.

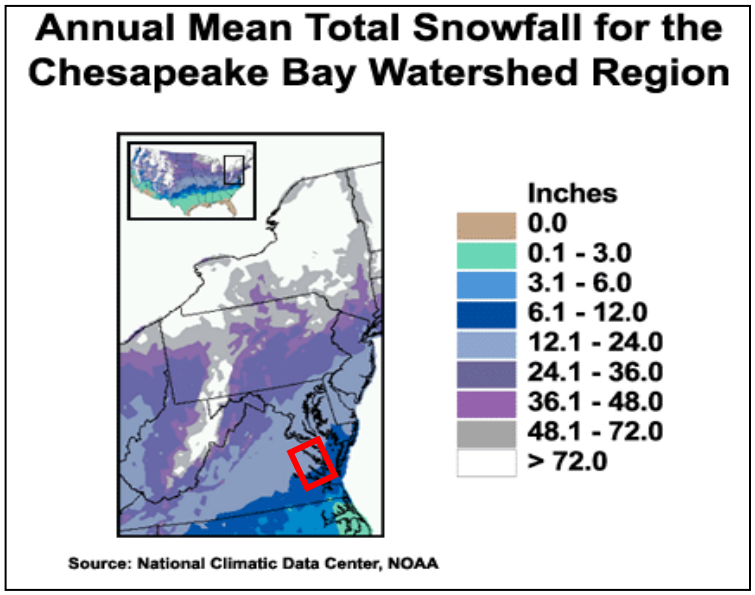


Figure 22: Map of annual mean total snowfall for the Chesapeake Bay Watershed region (StormCenter Communications, 2003). The area encompassing the Middle Peninsula is highlighted on the map with a red square.

Compared to western, northern, and mountainous regions of the state, the risk of high snow accumulations in the Middle Peninsula is low and will vary amongst localities (Figure 22). According to the National Climactic Data Center, mean annual snowfall in the Middle Peninsula ranges from between 6 and 12 inches at the lower reaches of the region (primarily in Gloucester and Mathews Counties) to as much as 12 to 24 inches in the upper reaches of the region (primarily in Essex, King and Queen, King William, and Middlesex Counties). The proximity of adjacent water bodies bordering the region (Chesapeake Bay and its tributaries) to the Atlantic Ocean allows the Bay to retain heat and buffer to the region from intense snow. The amount of snow that falls across the watershed varies both from year to year and from location to location. Generally, areas to the north, such as in Pennsylvania and New York, see more snow in an average year than locations in the southern part of the watershed. For areas to the south, such as Norfolk, winters typically pass without a measurable amount of snowfall.

Snow without ice has adverse impacts for the road transportation network, which therefore limits the ability of residents to have access to essential and for some, life-critical emergency medical care.

The ability of the local jurisdictions to provide critical public safety services (ie. fire, emergency medical and law enforcement) could be a focus of any mitigation strategies proposed in the update during the emergency response phase when severe snow events hit the Middle Peninsula.

In December of 2009, a major snowstorm slammed the East Coast and snarled the busy holiday travel season as airports shut down runways, rail service slowed, and bus routes were suspended on the last weekend before Christmas. Record snowfall totals were reported at Washington Dulles and Reagan National airports. Accumulation at Dulles reached 16 inches, breaking the old record of 10.6 inches set December 12, 1964; 13.3 inches was reported at Reagan. The old record there was 11.5 inches set December 17, 1932.

Snowfall Extent (Impact)

The Northeast Snowfall Impact Scale (NESIS) developed by Paul Kocin and Louis Uccellini of the NWS (Kocin and Uccellini, 2004) characterizes and ranks high-impact Northeast snowstorms. These storms have large areas of 10-inch snowfall accumulations and greater. NESIS has five categories: Extreme, Crippling, Major, Significant, and Notable. The index differs from other meteorological indices in that it uses population information in addition to meteorological measurements. Thus, NESIS gives an indication of a storm's societal impacts.

NESIS categories, their corresponding NESIS values, and a descriptive adjective:

Category	NESIS Value	Description
1	1—2.499	Notable
2	2.5—3.99	Significant
3	4—5.99	Major
4	6—9.99	Crippling
5	10.0+	Extreme

Winter Weather Section

Since the original plan was developed there has only been one significant snowfall event in the Middle Peninsula. According to the National Climatic Data Center (NCDC), on February 10, 2010, between 1 and 5 inches fell across the region. All land area within the region is subject to snowfall. Due to only two operating weather stations in King and Queen and King William Counties, there is little data available for additional analysis. Therefore, the information described in the West Virginia Extension Service in the original plan will suffice.

Additional impacts include downed power lines, roof collapses during heavy snow loads, as well as frozen utility lines during extreme cold events.

4.4.3. Hurricanes

Hurricanes are cyclonic storms that originate in tropical ocean waters. Most hurricanes develop in an area 300 miles on either side of the equator. Hurricanes are heat engines, fueled by the release of latent heat from the condensation of warm water. Their formation requires a low-pressure disturbance, sufficiently warm sea surface temperature, a rotational force resulting from the spinning of the earth and the absence of wind shear in the lowest 50,000 feet of the earth's atmosphere.

Hurricanes that impact Virginia form in the so-called Atlantic Basin - from the west coast of Africa towards the Caribbean Sea and Gulf of Mexico. Hurricanes in this basin generally form between June 1 and November 30 – with a peak around mid-September. In an average season, there are about 10 named

tropical storms in the Atlantic Basin with 6 of these likely to develop into hurricanes. The busiest hurricane season in the 20th century was in 1933, which saw 21 hurricanes/tropical storms. Two of these storms hit the Tidewater Region and caused significant devastation in the Middle Peninsula - known as the "Chesapeake-Potomac Hurricanes of 1933". By contrast, the 1914 season saw no hurricanes and only one tropical storm.

As a hurricane develops, barometric pressure at its center falls and winds increase. A weather system with winds at or exceeding 39 mph is designated as a tropical storm, which is given a name and closely monitored by the NOAA National Hurricane Center in Miami, Florida. When winds are at or exceed 74 mph, the tropical storm is deemed to be a hurricane. Hurricane intensity is measured using the Saffir-Simpson Scale, ranging from a Category 1 (minimal) to a Category 5 (catastrophic) hurricane.
The scale categorizes the intensity of hurricanes using a linear method based upon maximum sustained winds, minimum barometric pressure, and storm surge potential, which are combined to estimate the potential flooding and damage to property given a hurricane's estimated intensity. See the table below for greater details on the characteristics of Category 1 thru Category 5 hurricanes.

Hurricane Vulnerability
Hurricanes have the greatest potential to inflict damage as they cross the coastline from the ocean, which is called landfall. Because hurricanes derive their strength from warm ocean waters, they are generally subject to deterioration once they make landfall. The forward momentum of a hurricane can vary from just a few miles per hour to 40 mph. This forward motion, combined with a counterclockwise surface air flow, makes the right front quadrant of the hurricane the location of the most potentially damaging winds.

Hurricanes have the potential to spawn dangerous tornadoes. The excessive rainfall and strong winds can also cause flash floods, flooding and abnormal rises in sea levels known as storm surges. Although a hurricane may cause a tremendous amount of wind and water damage, the accompanying storm surge is much more dangerous to life and property in coastal regions. The storm surge is a great dome of water typically 50 miles wide that comes sweeping across the coastline near the area where the eye of the hurricane makes landfall. This storm surge, aided by the hammering effect of breaking waves, acts like a giant bulldozer as it sweeps everything in its path. The stronger the hurricane, the higher and more dangerous the storm surge will be. Nine out of ten hurricane fatalities are caused by the storm surge.

The vulnerability will vary amongst localities within the Middle Peninsula. As Gloucester and Mathews County are located within the Chesapeake Bay Carter, and therefore these lower lying areas of the region will be the most vulnerability. Also, generally, as hurricane hit land the storm is slowed therefore those coastal areas of the region will be at most risk. However secondary impacts may be experienced inland and in upland counties (i.e. King William, King & Queen, and Essex Counties).

Hurricane Extent (Impact)
The Saffir-Simpson Hurricane Wind Scale is a 1 to 5 categorization based on the hurricane's intensity at the indicated time. The scale – originally developed by wind engineer Herb Saffir and meteorologist Bob Simpson – has been an excellent tool for alerting the public about the possible impacts of various intensity hurricanes. The scale provides examples of the type of damage and impacts in the United States associated with winds of the indicated intensity. In general, damage rises by about a factor of four for every category increase.

Category One Hurricane

Very dangerous winds will produce some damage

(Sustained winds 74-95 mph, 64-82 kt, or 119-153 km/hr)

People, livestock, and pets struck by flying or falling debris could be injured or killed. Older (mainly pre-1994 construction) mobile homes could be destroyed, especially if they are not anchored properly as they tend to shift or roll off their foundations. Newer mobile homes that are anchored properly can sustain damage involving the removal of shingle or metal roof coverings, and loss of vinyl siding, as well as damage to carports, sunrooms, or lanais. Some poorly constructed frame homes can experience major damage, involving loss of the roof covering and damage to gable ends as well as the removal of porch coverings and awnings. Unprotected windows may break if struck by flying debris. Masonry chimneys can be toppled. Well-constructed frame homes could have damage to roof shingles, vinyl siding, soffit panels, and gutters. Failure of aluminum, screened-in, swimming pool enclosures can occur. Some apartment building and shopping center roof coverings could be partially removed. Industrial buildings can lose roofing and siding especially from windward corners, rakes, and eaves. Failures to overhead doors and unprotected windows will be common. Windows in high-rise buildings can be broken by flying debris. Falling and broken glass will pose a significant danger even after the storm. There will be occasional damage to commercial signage, fences, and canopies. Large branches of trees will snap, and shallow rooted trees can be toppled. Extensive damage to power lines and poles will likely result in power outages that could last a few to several days. Hurricane Dolly (2008) is an example of a hurricane that brought Category 1 winds and impacts to South Padre Island, Texas.

Category Two Hurricane

Extremely dangerous winds will cause extensive damage

(Sustained winds 96-110 mph, 83-95 kt, or 154-177 km/hr)

There is a substantial risk of injury or death to people, livestock, and pets due to flying and falling debris. Older (mainly pre-1994 construction) mobile homes have a very high chance of being destroyed and the flying debris generated can shred nearby mobile homes. Newer mobile homes can also be destroyed. Poorly constructed frame homes have a high chance of having their roof structures removed especially if they are not anchored properly. Unprotected windows will have a high probability of being broken by flying debris. Well-constructed frame homes could sustain major roof and siding damage. Failure of aluminum, screened-in, swimming pool enclosures will be common. There will be a substantial percentage of roof and siding damage to apartment buildings and industrial buildings. Unreinforced masonry walls can collapse. Windows in high-rise buildings can be broken by flying debris. Falling and broken glass will pose a significant danger even after the storm. Commercial signage, fences, and canopies will be damaged and often destroyed. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks. Potable water could become scarce as filtration systems begin to fail. Hurricane Frances (2004) is an example of a hurricane that brought Category 2 winds and impacts to coastal portions of Port St. Lucie, Florida with Category 1 conditions experienced elsewhere in the city.

Category Three Hurricane

Devastating damage will occur

(Sustained winds 111-130 mph, 96-113 kt, or 178-209 km/hr)

There is a high risk of injury or death to people, livestock, and pets due to flying and falling debris. Nearly all older (pre-1994) mobile homes will be destroyed. Newer mobile homes will sustain severe damage with potential for complete roof failure and wall collapse. Poorly constructed frame homes can be destroyed by the removal of the roof and exterior walls. Unprotected windows will be broken by flying debris. Well-built frame homes can experience major damage involving the

removal of roof decking and gable ends. There will be a high percentage of roof covering and siding damage to apartment buildings and industrial buildings. Isolated structural damage to wood or steel framing can occur. Complete failure of older metal buildings is possible, and older unreinforced masonry buildings can collapse. Numerous windows will be blown out of high-rise buildings resulting in falling glass, which will pose a threat for days to weeks after the storm. Most commercial signage, fences, and canopies will be destroyed. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to a few weeks after the storm passes. Hurricane Sandy (2012) is an example of a hurricane that brought Category 3 winds and impacts to coastal portions of Cuba, but it downgraded to a Category 2 storm off the coast of the Northeast.

Category Four Hurricane

Catastrophic damage will occur

(Sustained winds 131-155 mph, 114-135 kt, or 210-249 km/hr)

There is a very high risk of injury or death to people, livestock, and pets due to flying and falling debris. Nearly all older (pre-1994) mobile homes will be destroyed. A high percentage of newer mobile homes also will be destroyed. Poorly constructed homes can sustain complete collapse of all walls as well as the loss of the roof structure. Well-built homes also can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Extensive damage to roof coverings, windows, and doors will occur. Large amounts of windborne debris will be lofted into the air. Windborne debris damage will break most unprotected windows and penetrate some protected windows. There will be a high percentage of structural damage to the top floors of apartment buildings. Steel frames in older industrial buildings can collapse. There will be a high percentage of collapse to older unreinforced masonry buildings. Most windows will be blown out of high-rise buildings resulting in falling glass, which will pose a threat for days to weeks after the storm. Nearly all commercial signage, fences, and canopies will be destroyed. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Long-term water shortages will increase human suffering. Most of the area will be uninhabitable for weeks or months. Hurricane Charley (2004) is an example of a hurricane that brought Category 4 winds and impacts to coastal portions of Punta Gorda, Florida with Category 3 conditions experienced elsewhere in the city.

Category Five Hurricane

Catastrophic damage will occur

(Sustained winds greater than 155 mph, greater than 135 kt, or greater than 249 km/hr)

People, livestock, and pets are at very high risk of injury or death from flying or falling debris, even if indoors in mobile homes or framed homes. Almost complete destruction of all mobile homes will occur, regardless of age or construction. A high percentage of frame homes will be destroyed, with total roof failure and wall collapse. Extensive damage to roof covers, windows, and doors will occur. Large amounts of windborne debris will be lofted into the air. Windborne debris damage will occur to nearly all unprotected windows and many protected windows. Significant damage to wood roof commercial buildings will occur due to loss of roof sheathing. Complete collapse of many older metal buildings can occur. Most unreinforced masonry walls will fail which can lead to the collapse of the buildings. A high percentage of industrial buildings and low-rise apartment buildings will be destroyed. Nearly all windows will be blown out of high-rise buildings resulting in falling glass, which will pose a threat for days to weeks after the storm. Nearly all commercial signage, fences, and canopies will be destroyed. Nearly all trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Long-term water shortages will increase human suffering. Most

of the area will be uninhabitable for weeks or months. Hurricane Andrew (1992) is an example of a hurricane that brought Category 5 winds and impacts to coastal portions of Cutler Ridge, Florida with Category 4 conditions experienced elsewhere in south Miami-Dade County

Hurricane Isabel in 2003 was one of Virginia's costliest disasters, causing widespread devastation and disrupting the lives of thousands of citizens – including those living in the Middle Peninsula. This deadly storm was a Category 2 hurricane when it made landfall between Cape Lookout and Cape Hatteras on North Carolina's Outer Banks on Thursday, September 18, 2003. By the time it reached Virginia, it was downgraded to a Category 1 hurricane. Even though the storm followed a path west of the City of Richmond, Isabel's destructive effects were felt throughout Tidewater Virginia and the entire Mid-Atlantic Region.

Hampton Roads remained in the right front quadrant through most of the storm's landfall, which helped to push the storm surge into many inland areas along the rivers. Property damage resulting from the 4 to 12-foot storm surge was extensive in many parts of the region. Homes, bulkheads and piers were damaged, and the winds resulted in significant damage to properties and power lines. Rainfall totaled between 2 and 11 inches along the storm's track. Trees, especially those with shallow root systems, were blown over. Damages due to wind, rain, and storm surge resulted in flooding, electrical outages, piles of debris, transportation interruptions and damaged homes/businesses. Many citizens were without power for several days - with others in remote locations of the Middle Peninsula without power for up to three weeks.

Statewide losses to residential property were estimated to exceed $590 million and businesses reported over $84 million in losses. Thirty-two deaths were directly or indirectly attributed to this storm in Virginia. One of these deaths was in Gloucester County when an individual died of a heart attack after their vehicle was swept up in high water. Hurricane Isabel is considered one of the most significant tropical cyclones to affect portions of northeastern North Carolina and east-central Virginia since Hurricane Hazel in 1954 and the Chesapeake-Potomac Hurricane of 1933 (Beven and Cobb, 2004).

Although Virginia was spared a direct hit, the hurricane season of 2004 may be the costliest on record in the United States. Fifteen tropical or subtropical storms formed in the North Atlantic. Nine of these storms become hurricanes with six becoming major hurricanes of Category 3 or higher on the Safflir-Simpson Hurricane Scale. Six of the hurricanes, Alex, Charley, Frances, Gaston, Ivan and Jeanne, and three tropical storms struck the United States in 2004. The strongest hurricane was Ivan, which reached Category 5 status. Ivan was directly blamed from 26 deaths and damage estimates were $13 billion in the United States.

With 4 hurricanes and tropical storms hitting the United States in a 5-week period, 2004 has been labeled as the year of the hurricane according to leading experts who participated in a Center for Health and the Global Environment briefing at Harvard Medical School (Compass Publications, Inc. 2004). They report that the intense period of destructive weather may be a harbinger of what is to come. Hurricanes have been on the increase over the past decade as part of a natural multi-decadal cycle (Ananthaswamy, 2003). These storms are more likely to form when the Atlantic is warm, as it was from the 1930s to the 1960s.

Although the decades since the 1960s have seen fewer hurricanes, numbers have risen since 1995 and may not have reached the predicted peak yet. There is growing evidence and concern that tropical storms will be more intense and pronounced as future climate changes are expected to persist.

By virtue of its position along the Atlantic Ocean and near the Gulf Stream, southeastern Virginia is frequently impacted by hurricanes. Continuous weather records for the Hampton Roads Area of Virginia

began on January 1, 1871, when the National Weather Service was established in downtown Norfolk. However, the recorded history of significant tropical storms that affected the area goes back much further.

Prior to 1871, very early storms have been described in ship logs, newspaper accounts, history books, and countless other writings. The residents of coastal Virginia during Colonial times were very much aware of the weather. They were a people that lived near the water and largely derived their livelihood from the sea. To them, a tropical storm was indeed a noteworthy event. The excellent records left by some of Virginia's early settlers and from official records of the National Weather Service are summarized in the "*Chronology of Middle Peninsula Hazard Events.*"

Since 1953, Atlantic tropical storms have been named from lists originated by the National Hurricane Center. The lists featured only women's names until 1979, after which male and female names were included in the lists for both the Atlantic and Gulf of Mexico storms. Whenever a hurricane has had a major impact, any country affected by the storm can request that the name of the hurricane be "retired" by agreement of the World Meteorological Organization (WMO). Retiring a name means that it cannot be reused for at least 10 years, to facilitate historic references, legal actions, insurance claim activities, etc. and to avoid public confusion with another storm of the same name. Retired names for storms that hit the Tidewater Region include Agnes (1972), Cleo (1964), David (1979), Donna (1960), Floyd (1999), Fran (1996), Gloria (1985), Gracie (1959), Hazel (1954), and Isabel (2003) (NOAA Atlantic Oceanographic and Meteorological Laboratory, Hurricane Research Division).

Middle Peninsula Storm Surge Hazard Maps

In order to estimate the geographic extent of potential damage from these hurricanes, a review of the 2008 Middle Peninsula Storm Surge Hazard Maps show the worst-case scenario of hurricane storm surge inundation at mean tide. Figures 29- 32 are maps developed by the U.S. Corp of Engineers in conjunction with the VDEM as part of their 2008 Virginia Hurricane Evacuation Study.

Due to the nature of the study, only Mathews, Gloucester and Middlesex Counties in the Middle Peninsula were included since they are considered coastal counties that suffer greatly from tidal surge impacts and therefore have impacts for evacuating residents from low-lying areas. Although the limits of the study only included the lower half of our region, it should be noted that all Middle Peninsula localities experienced storm surges during the latest severe storm - Hurricane Isabel in September 2003.

The data reflects only still saltwater flooding. Freshwater flooding may also occur with hurricane events from heavy rainfall runoff, and waves may accompany the surge and cause further inundation. The maps represent the surge from Category 1 through 4 hurricanes. State and federal officials do not include storm surges from a Category 5 hurricane since they do not believe that the ocean water temperature off of the Virginia Coast is warm enough for such an intense storm.

Figures 23 through 26 summarize surge height estimates using the SLOSH (Sea, Lake, and Overland Surges from Hurricanes) model is a numerical model used by the National Weather Service (NWS) to compute storm surge. Storm surge is defined as the abnormal rise of water generated by a storm, over and above the predicted astronomical tides. Flooding from storm surge depends on many factors, such as the track, intensity, size, and forward speed of the hurricane and the characteristics of the coastline where it comes ashore or passes nearby. For planning purposes, the National Hurricane Center (NHC) uses a representative sample of hypothetical storms to estimate the near worst–case scenario of flooding for each hurricane category.

Figure 23: Storm Surge Inundation Map of Middlesex, Gloucester, and Mathews Counties (NOAA, 2022).

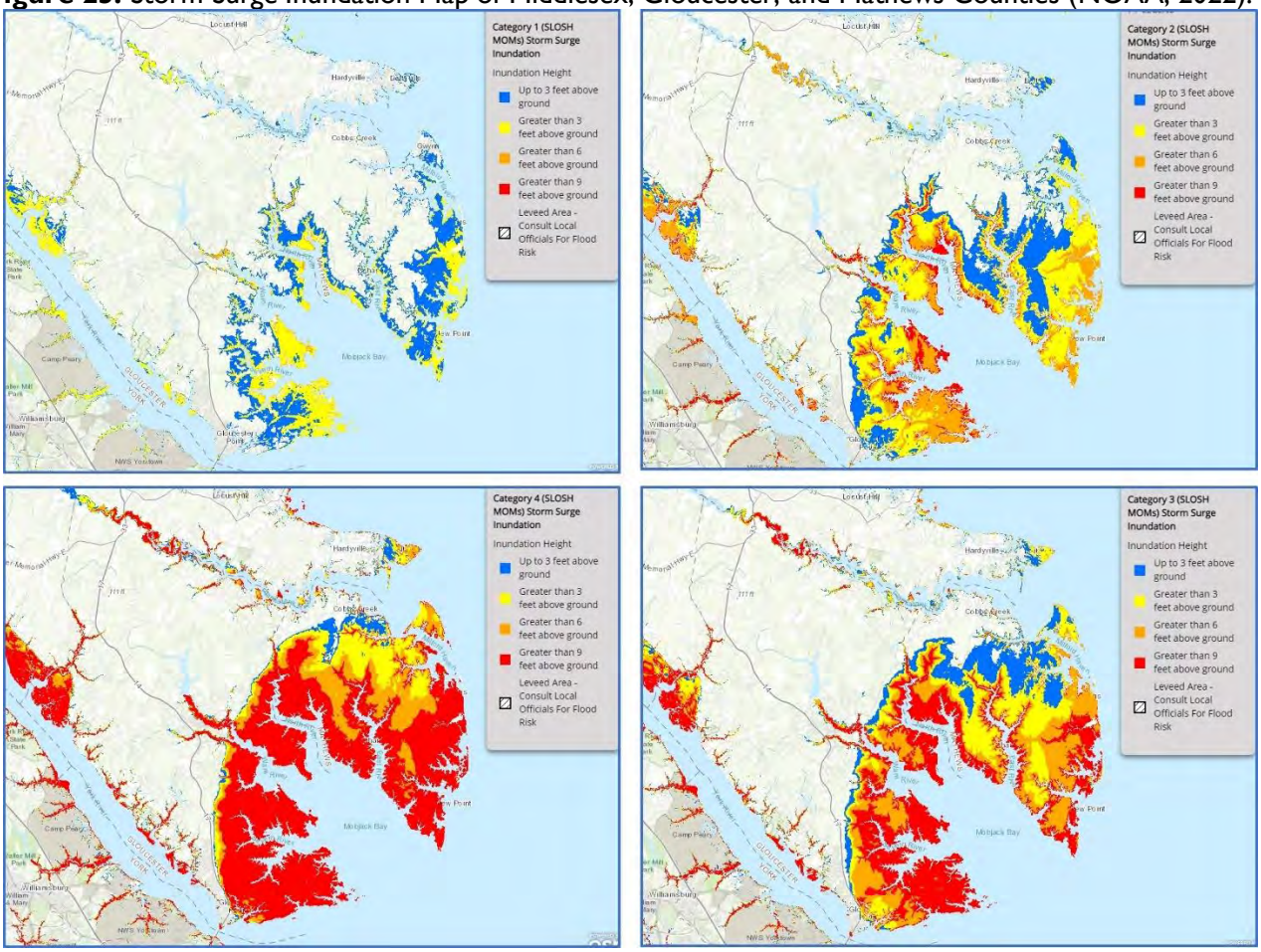


Figure 24: Storm Surge Inundation Map of Middlesex County (VDEM, 2022).

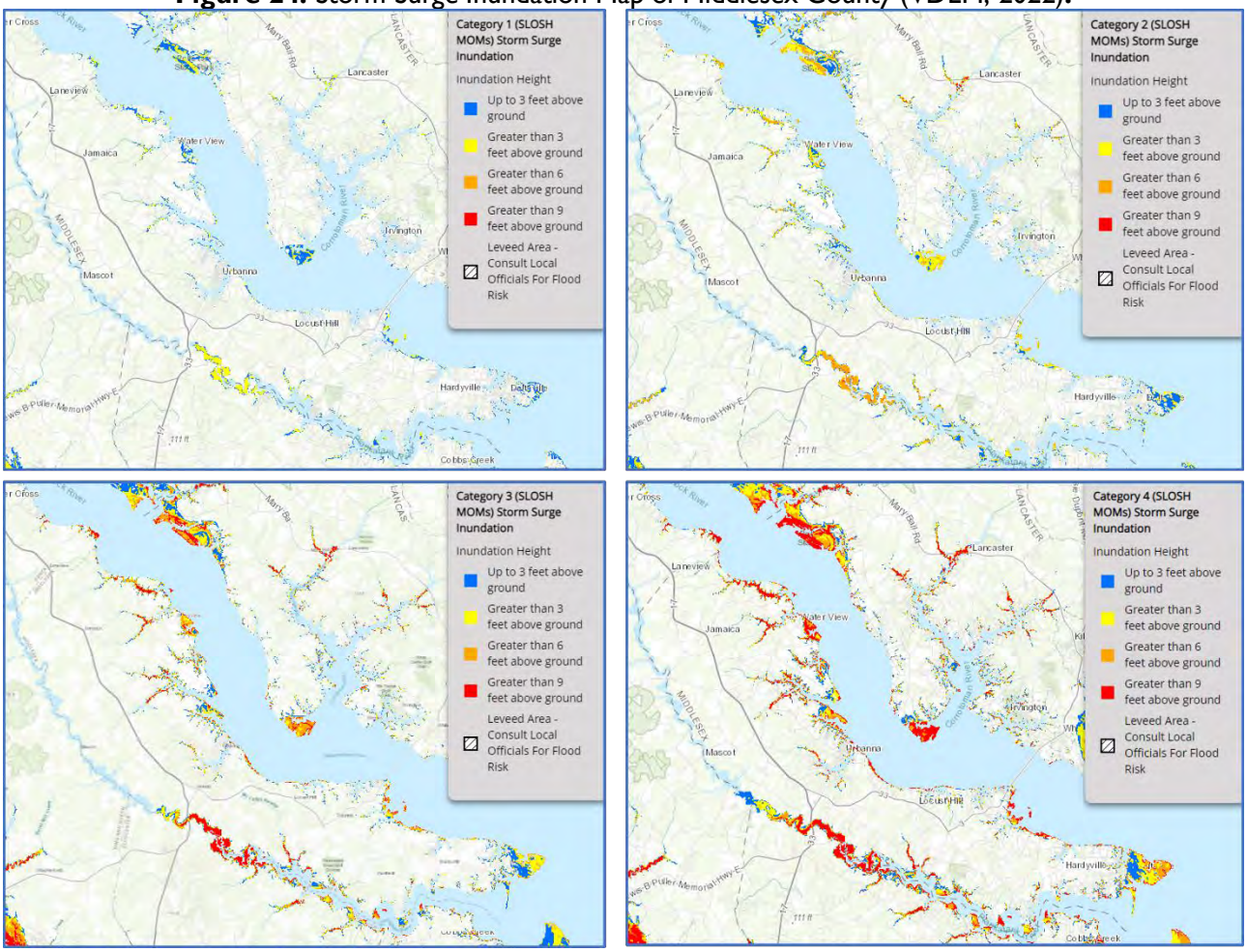


Figure 25: Storm Surge Inundation Map of Essex County (NOAA, 2022).

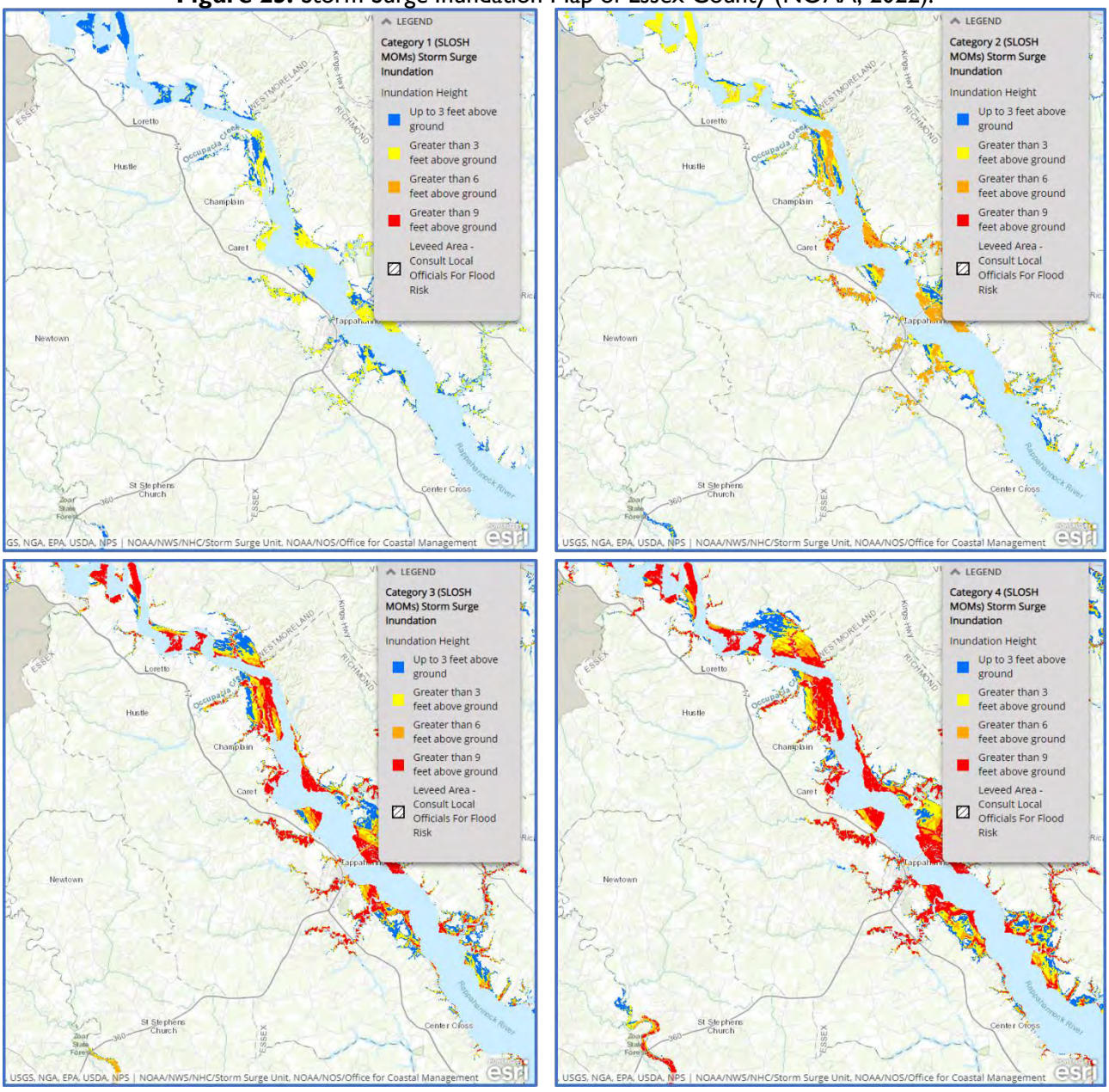
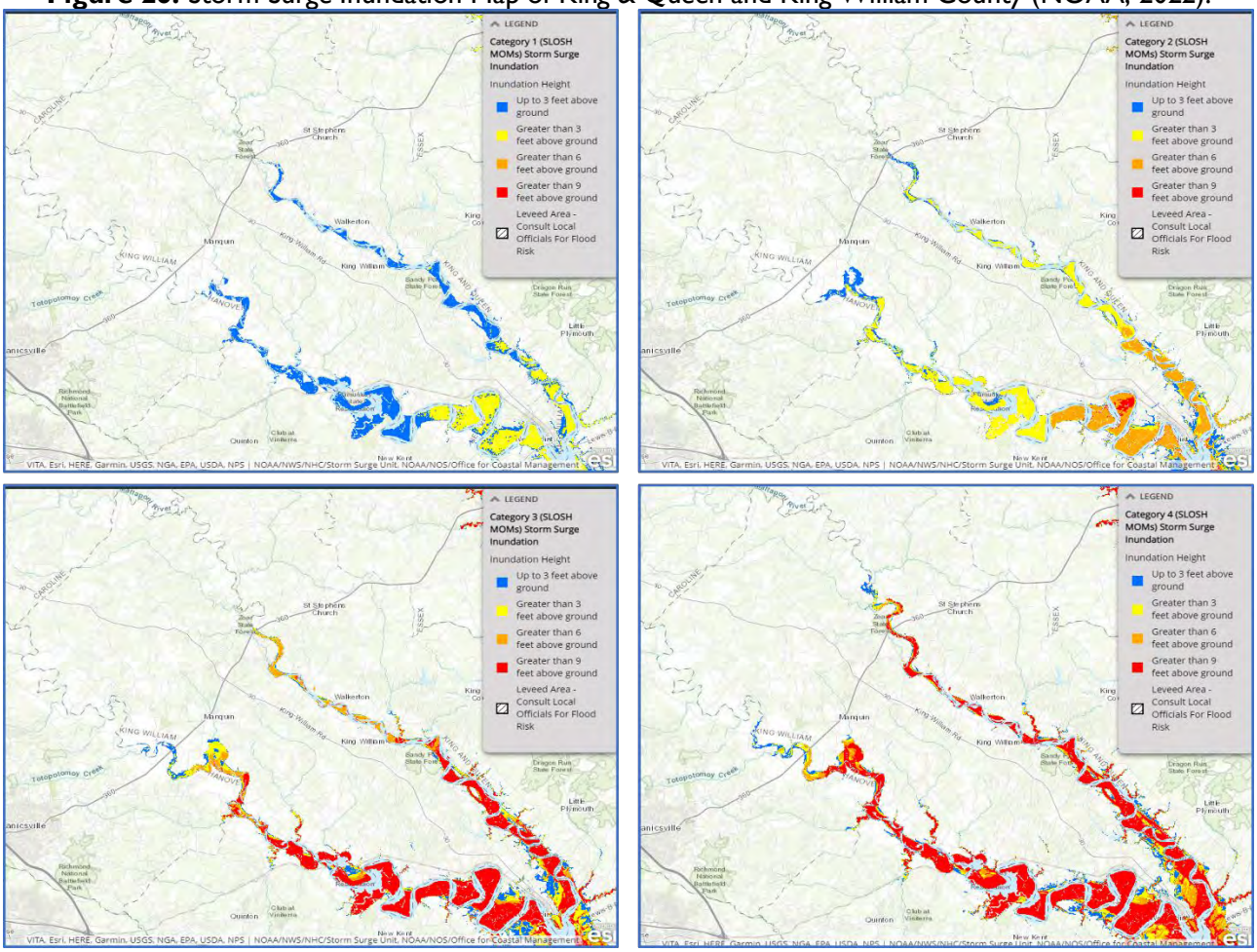


Figure 26: Storm Surge Inundation Map of King & Queen and King William County (NOAA, 2022).



Historical Occurrences

In evaluating localized threats of hurricanes and tropical storms to the Middle Peninsula Region, NOAA hurricane tracking data from 1851 to 2020 was analyzed to identify storms that may have posed a threat to the region.

Based on this data, 90 storms - including hurricanes, tropical storms and tropical depressions - passed within 25 nautical miles of the Middle Peninsula Region. Of these storms 5 were hurricanes, 31 were tropical storms, 9 were tropical depressions, and 18 were extra-tropical storms (Table 22). Over the same period of time, 63 storms passed within 50 nautical miles of the region, including 13 hurricanes, 31 tropical storms, 9 tropical and subtropical depressions, and 18 extra-tropical storms (Table 22).

Table 22: Historic Storm Tracks within 50 and 25 nautical mile radii of the Middle Peninsula between 1851 and 2020.		
Type of Storm	**Quantity passing within 50 nm**	**Quantity passing within 25 nm**
Hurricane – Category 5 (winds >157 mph)	0	0
Hurricane – Category 4 (winds 130-156 mph)	0	0
Hurricane – Category 3 (winds 111-129 mph)	1	0
Hurricane – Category 2 (winds 96-110 mph)	1	1
Hurricane – Category 1 (winds 74-95 mph)	11	4
Tropical Storm (winds 39-73 mph)	46	31
Tropical Depression (winds <38 mph)	9	9
Extra Tropical Storm	22	18
Total:	**90**	**63**

General Chronology of Middle Peninsula Coastal Storm Hazard Events
Because of its proximity to the Atlantic Coast and Chesapeake Bay, the Middle Peninsula has been impacted by coastal storms throughout recorded history.

Hurricanes come close enough to produce hurricane force winds approximately three times every 20 years. Two or three times a century, winds and tides produce considerable damage and significantly threaten life. Historical records are invaluable to researchers trying to understand long-term patterns in the frequency and intensity of coastal storms and such data on storms and weather go back a long time in Virginia, thanks to record keeping by early weather observers such as George Washington, James Madison and Thomas Jefferson as well as journals/articles written by early settlers. The following is a brief synopsis of the major coastal storm events that have impacted the Middle Peninsula Region.

From 1564 to 1799
Hurricanes played an important role during the European exploration and colonization of the Americas. Great storms that besieged Virginia influenced the establishment of new settlements and changed the coastal geography, particularly on the Middle Peninsula. While official weather records did not begin until 1871 in Norfolk, tremendous coastal storms were often recorded through the shipwrecks they induced and in the writings of the early Virginia colonists.

The records of hurricane and tropical storm occurrences during this era are sparse compared to modern-day accounts, since the colonies were not settled until the early 1600's. The original settlers at Jamestown experienced the wrath of such storms firsthand and it is suggested that the lost colony of Roanoke Island may have been doomed by a coastal storm. The first such storm to be recorded occurred in 1564. Others followed in June 1566, June 1586, August 1587, and August 1591. A September 1667 storm, deemed the "Dreadful Hurry Cane of 1667", destroyed thousands of homes in Virginia (Brinkley, 1999). Twelve days of rain was said to have followed this storm, causing the Chesapeake Bay to rise 12 feet. This storm and a July 1788 hurricane may have followed a similar track as the 1933 hurricane, which caused massive devastation to the Middle Peninsula.

The October Hurricane of 1749 was a great disaster for Virginians. It formed Willoughby Spit in Norfolk and put the city streets of Hampton 4 feet below water. The Bay was said to have risen 15 feet above normal, destroying waterfront buildings (Ludlum, 1963). At least 50 vessels were driven ashore along the Virginia coast, with a loss of 22 lives. Damage in and around the city of Norfolk was estimated to be at least 30,000 Virginia Pounds (approximately $3 million in today's currency – Brinkley, 1999).

The September 8, 1769, hurricane, considered one of the worst storms of the eighteenth century, passed over Williamsburg. Damage was "inconceivable" and crops were destroyed. Many old homes and trees were leveled. Heavy rain ruined tobacco crops and flooded roads. Tobacco in storage warehouses was also damaged. Heavy damage was seen in Chesapeake Bay. High winds tore off the top of a wharf at Yorktown and a schooner rammed a nearby storehouse. Four ships in the York River were driven ashore. Two ships on the James River were also wrecked. A vessel from Norfolk, filled with coal from Williamsburg, was forced up to Jamestown before it went to pieces (Roth and Cobb, 2001).

"The Independence Hurricane" of September 1775 ravaged the coast between Currituck, N.C., and Chincoteague on the Eastern Shore. Wharves and storehouses on the waterfront of Norfolk were devastated. Raging waters carried bridges away. At Williamsburg, mill-dams broke and corn stalks were blown flat. Many ships were damaged as they were thrown ashore at Norfolk, Hampton, and York. A full blockade of Hampton Roads thereafter brought shipping to a halt for three months. At least 25 died due to a shipwreck. On September 9, 1775, a Williamsburg correspondent of the Virginia Gazette wrote, "The shocking accounts of damage done by the rains last week are numerous; most of the mill-dams are broke, the corn laid almost level with the ground, and fodder destroyed; many ships and other vessels drove ashore and damaged at Norfolk, Hampton, and York. The death toll in Virginia and North Carolina was 163 lives (Roth and Cobb, 2001).

A strong gale played a role in a battle between the Royal Governor of Virginia, Dunmore, and General Lewis of the rebel forces on July 10, 1776. The royal fleet had been injured prior to the storm by General Lewis' forces and was sailing from Gwynn's Island (Mathews County) toward St. George's Island, in the Potomac. The British crew was without water and enduring smallpox when the gale struck. A flour-laden supply ship ran aground. One ship foundered at the Mouth of the Rappahannock, while another was stranded on the Eastern shore (Roth and Cobb, 2001).

On October 16, 1781, a storm of "unknown character" struck Virginia. The French Fleet and the Patriot Army, under the command of George Washington, trapped the Earl of Cornwallis at Yorktown. The Earl decided to flee to the north to Gloucester Point under the cover of darkness. A "furious storm" doomed the plan to failure, as seas ran high, and every boat was "swamped." He sent forward his flag of truce and surrendered, thus ending the battle (Roth and Cobb, 2001).

The "most tremendous gale of wind known in this country" passed over the Lower Chesapeake Bay September 22-24, 1785 and went along a track very similar to the Chesapeake-Potomac Hurricane of 1933 and likely severely impacted the Middle Peninsula. At Norfolk, lower stories of dwellings were flooded. Warehouses were totally carried away by the storm surge, causing large amounts of salt, sugar, corn, and lumber to disappear. A large number of cattle drowned, and people hung onto trees for dear life during the tempest. Vessels floated inland into cornfields and wooded areas (Roth and Cobb, 2001).

"George Washington's Hurricane" of July 23-24, 1788, made landfall in Virginia and passed directly over the Lower Chesapeake Bay and Mount Vernon, the home of George Washington. This track is very similar to the track of the Chesapeake-Potomac Hurricane of 1933. At Norfolk, winds increased at 5 p.m. on the 23rd with the wind originating from the northeast. At 12:30 a.m., the wind suddenly shifted to the south and "blew a perfect hurricane, tearing down chimneys, fences, and leveling corn." In addition, large trees were uprooted, and houses were moved from their foundations. Port Royal (Caroline County) and Hobb's Hole (Essex County) experienced a violent northeast gale, which drove several vessels ashore. In Fredericksburg, great quantities of corn, tobacco, and fruit were destroyed. Houses and trees fell in great numbers across Northumberland, Lancaster, Richmond and Westmoreland Counties on the Northern Neck. Crops were destroyed and many livestock perished in lower Mathews County. Many plantations saw their houses leveled. Homes were flooded with water six feet deep and several inhabitants drowned.

Gloucester County was inundated, and an estimated $400,000 (in 1788 dollars) in damage was incurred (Roth and Cobb, 2001).

1800-1899

Great Coastal Hurricane of 1806 (August 23) caught British and French ships off guard, while engaged in the Napoleanic Wars in the U.S. shipping lanes. The British man-of-war *L'Impeteax* drifted under jury masts for 23 days before finally beaching near Cape Henry. Ships of the two warring nations put in for repair and refitting at the port of Norfolk after the storm. This hurricane, due to its slow movement and consequent erosion of the coastline, completed the creation of Willoughby Spit at Hampton Roads. A seawall built to prevent further erosion at Smith Point lighthouse at the mouth of the Potomac River was damaged (Roth and Cobb, 2001).

A severe coastal storm dropped heavy rains on the Fredericksburg area in January 1863. It rained for 30 hours, dropping more than twelve inches, making mud so deep that mules and horses died attempting to move equipment. The rivers became too high and swift to cross, disrupting the Union Army offensive operation in the ill-famed "Mud March" (Watson and Sammler, 2004).

The Gale of '78 was one of the most severe hurricanes to affect eastern Virginia in the latter half of the 19th century and struck on October 23, 1878. This hurricane moved rapidly northward from the Bahamas on October 22nd and struck the North Carolina coast later that same day moving at a forward speed of 40 to 50 mph. The storm continued northward passing through east central Virginia, Maryland, and eastern Pennsylvania. Cobb and Smith Islands on the Eastern Shore were completely submerged during this storm (Roth and Cobb, 2001).

A September 1882 tropical storm, the "protracted and destructive rainstorm", swept away four mills near Ware's Wharf along the lower Rappahannock. The brunt of the cyclone only extended fifty miles inland. Heavy rains were also seen at Washington, D.C. (Roth and Cobb, 2001).

During an April 1889 Nor'easter, the Tidewater Region had sustained winds from the north of 75 mph measured at Hampton Roads and 105 mph at Cape Henry. Tides at Norfolk reached 8.37 feet above Mean Low Water, which is over 4 feet above flood stage level (Watson and Sammler, 2004).

Noteworthy hurricanes or tropical storms also occurred in September 1821 (one of the most violent on record for the 19th century), June 1825, August 1837, September 1846 (which formed Hatteras and Oregon Inlets in North Carolina), August 1850, September 1856, September 1876, August 1879, October 1887, August 1893, September 1894, October 1897 (tides in Norfolk rose 8.1 feet above Mean Lower Low Water), and October 1899 (tide in Norfolk rose 8.9 feet above Mean Lower Low Water).

From 1900 to 1999

A number of coastal storms hit the Tidewater Region in the early part of the 20th century. Hurricanes and tropical storms in October 1903, August 1924, September 1924, August 1926, and September 1928 each brought high winds (in excess of 70 mph measured in Norfolk and in Cape Henry). The 1903 and 1928 storms also raised tides as much as 9 feet and 7 feet, respectively, higher than normal in the region (Roth and Cobb, 2001).

The summer of 1933 was the most active storm season for eastern Virginia in the 20th century. Two hurricanes, one on August 23 and one on September 16, struck the North Carolina and Virginia coasts and caused much devastation on the Middle Peninsula. In Chesapeake lore, the "Storm of '33" is recalled by older residents and enshrined in legend as the worst storm in memory (Mountford, 2003). The August

storm brought winds in excess of 80 mph and a storm surge that forced the tide nearly 10 feet above normal.

The September storm struck the area 24 days later and had sustained winds as high as 88 mph (measured at the Naval Air Station in Norfolk) and the tide reached 8.3 feet above Mean Lower Low Water (Roth and Cobb, 2001). Much of the land around the New Point Comfort lighthouse, the third oldest light on the Bay located at the entrance to Mobjack Bay and the mouth of the York River in Mathews County, was washed away and caused the lighthouse to be stranded on a very small island a few 100 yards from the tip of the mainland.

Hurricane Hazel hit eastern Virginia on October 15, 1954. This storm brought with it gusts of 100 mph which is the highest wind speed record at the Norfolk Airport location. A reliable instrument in Hampton recorded 130 mph winds (Roth and Cobb, 2001).

A severe nor'easter gave gale force winds (40+ mph) and unusually high tides to the Tidewater Virginia area on April 11, 1956. At Norfolk, the strongest wind gust was 70 mph. The strong northeast winds blew for almost 30 hours and pushed up the tide, which reached 4.6 feet above normal in Hampton Roads. Thousands of homes were flooded by the wind-driven high water and damages were huge. Two ships were driven aground. Waterfront fires were fanned by the high winds. The flooded streets made access by firefighters very difficult, which added to the losses (Watson and Sammler, 2004).

The "Ash Wednesday Storm" hit Virginia during "Spring Tide" (sun and moon phase to produce a higher-than-normal tide) on March 5-9, 1962. The storm moved north off the coast past Virginia Beach and then reversed its course moving again to the south and bringing with it higher tides and higher waves which battered the coast for several days. The storm's center was 500 miles off the Virginia Capes when water reached 9 feet at Norfolk and 7 feet on the coast. Huge waves toppled houses into the ocean and broke through Virginia Beach's concrete boardwalk and sea wall. Houses on the Middle Peninsula also saw extensive tidal flooding and wave damage. The beaches and shorefront had severe erosion (Watson and Sammler, 2004).

Hurricane Cleo in September 1964 produced the heaviest coastal rainfall in the area (11.40 inches in 24 hours) since records began in 1871 (Roth and Cobb, 2001).

Hurricane Agnes was downgraded to a tropical depression by the time it moved into Virginia in June 1972, but the rainfall produced by Agnes made this storm more than twice as destructive as any previous hurricane in the history of the United States (Roth and Cobb, 2001).

In July 1996, Hurricane Bertha passed over portions of Suffolk and Newport News. Bertha spawned 4 tornadoes across east-central Virginia. The strongest, an F1 tornado, moved over Northumberland County injuring 9 persons and causing damages of several million dollars. Other tornadoes moved over Smithfield, Gloucester and Hampton (Roth and Cobb, 2001).

In September 1999, Hurricane Floyd produced 10 to 20 inches of rain on saturated ground and resulted in a recorded 500-year flood for Franklin, VA. While North Carolina and southeastern Virginia were hit with the brunt of this storm, significant damage from downed trees and localized flooding occurred and all of the counties of the Middle Peninsula were included in the Federal Disaster Declaration (FEMA FEMA-1293-DR, Virginia).

From 2000 to 2009
Hurricane Isabel hit the coasts of North Carolina and Virginia on September 18, 2003. It was a Category 1 hurricane when it made landfall. The highest sustained wind was 72 mph at Chesapeake Light. Storm surge varied significantly across the region. At Sewell's Point in Norfolk, the maximum water level was 7.9 feet above MLW. This represented a 5-foot storm surge - the biggest in the region since Hurricane Hazel in 1954. Thirty-six deaths were attributed to Hurricane Isabel in Virginia, including one in Gloucester County. Total damages for the Hampton Roads area amounted to $506 million.

In 2004, Tropical Storm Gaston caused serious damage to a handful of VDOT Secondary Roads in the Central Garage/Manquin sections of King William County.

In 2006, Tropical Storm Ernesto caused residential and roadway flooding damage as well as beach erosion damage in Mathews County.

There were an additional 5 named tropical events during this period to hit the Middle Peninsula region resulting in minor severe weather damage.

In 2009 Middle Peninsula coastal localities experienced a significant Nor-Easter with high winds and coastal flooding.

From 2010-2015
Hurricane Irene was hit the coast of North Carolina and had impacts on the Virginia coastal on August 26-27, 2011. Heavy rain, including some totals more than 10 inches, fell on eastern sections of Virginia. Irene lashed the eastern third of Virginia with tropical storm and isolated hurricane force gusts.

In early September 2011, the remand of Tropical storm Lee produced flash flooding in some sections of eastern Virginia, with the Washington, DC, suburbs particularly hard hit.

Hurricane Sandy ate season hurricane that passed off the Mid Atlantic coast, before turning west, and striking the New Jersey & New York coast on October 29, 2012. Sandy was a very large storm that was transitioning from a tropical to a non-tropical storm as it moved north paralleling the U.S. East coast during the October 27-29 time frame. Sandy's impact was relatively small in Virginia, with very heavy rainfall and some flooding the biggest impacts. The most significant impact was felt on the DELMARVA, especially on the east side of the Chesapeake Bay from Salisbury, MD southward to Onancock, VA, where severe coastal flooding and storm surge inundated many areas, as Sandy passed by to the north. Crisfield, MD and Saxis, VA were hardest hit, with millions of dollars in damage to homes and businesses. Damage and flooding were worse than that which occurred in the same area during Hurricane Floyd (1999).

On record for the 2014 season, eight name tropical or subtropical storms formed in the North Atlantic. Six of these became hurricanes and two of these reached major hurricanes of Category 3 or higher on the Saffir-Simpson Hurricane Scale. Six of the hurricanes, Arthur, Bertha, Cristobal, Edouard, Fay, Gonzalo and Hanna, and one tropical storm struck the United States. According to the NWS, activity in the basin in 2-14 was only about 63% of the 1981-2010 average.

From 2016-2020
Tropical Storm Hermine moved northeast along the Southeast Coast then off the Mid-Atlantic Coast producing tropical storm force winds, minor to moderate coastal flooding, and heavy rainfall. Gloucester Courthouse reported 0.43 inches of rain.

Hurricane Dorian tracking northeast along the North Carolina coast and just off the Virginia coast produced tropical storm winds and associated wind damage across ports of southeast Virginia in May 2019. Within the Middle Peninsula, Gloucester, and Mathews Counties were impacted. Strom winds downed trees and power lines that caused power outages.

In August 2020, the center of Tropical Storm Isaias tracked north just inland of the Middle Atlantic Coast. The tropical storm produced tropical storm force winds and associated wind damage across Gloucester, Mathews, and Middlesex Counties.

Soil Erosion

Hurricanes and nor'easters produce severe winds and storm surges that create significant soil erosion along rivers and streams in the Middle Peninsula. In addition to the loss of soil along these water bodies, there is damage to man-made shoreline hardening structures such as bulkheads and rap-rap as well as to piers, docks, boat houses and boats due to significant storm surges.

These damages are more severe along the broad open bodies of water on major rivers located closer to the Chesapeake Bay. In general terms, the damage is less intense as you move up the watershed from the southeastern area of the region towards the northwestern end of the Middle Peninsula. Therefore, the soil erosion would is most severe in Mathews, Gloucester and Middlesex Counties and to a lesser degree in the 3 remaining Middle Peninsula Counties of King and Queen, King William, and Essex Counties.

The location and the angle at which these hurricanes/nor'easters come ashore region can significantly affect the amount of soil erosion during a particular storm. It can generally be said that hurricane generated soil erosion is uneven in occurrence and that the storm surge affords 2 opportunities for erosion – once as water inundates low-lying amount coast lands and again as floodwaters ebb.

For example, with Hurricane Isabel in 2003, its enormous wind field tracked in a north-northwest direction to the west of the Chesapeake Bay with the right front quadrant blowing from the south-southeast. This pushed the storm surge up the Bay and piling it into the western shore – causing serious soil erosion to the eastern land masses in Mathews, Gloucester and Middlesex Counties.

Destructive as it was, Hurricane Isabel might have been worse. If it had been stronger at landfill, the storm surge generated in the Chesapeake Bay may have been higher. Had it stalled along its path and lingered through several tide cycles, prolonged surge conditions, exacerbated by high winds, might have cause more severe erosion. If rainfall has been higher, bank erosion due to slope failure might have been more common, particularly given the wetter than normal months that preceded Hurricane Isabel.

4.4.4. Communicable Disease

According to the Commonwealth of Virginia Hazard Mitigation Plan (2018), *A communicable disease is an illness caused by an infectious agent or its toxic products that develops when the agent or its product is transmitted from an infected person, animal, or arthropod to a susceptible host. Infectious agents include viruses, bacteria, fungi, parasites, or aberrant proteins called prions. The infectious agent might spread by one of several mechanisms, including contact with the infected individual or his or her body fluids, contact with contaminated items or a vector, or contact with droplets or aerosols. An infection, which is the actual spread of the infectious agent or its toxic product, is not synonymous with disease because an infection may not lead to the development of clinical signs or symptoms. Examples of communicable diseases include Zika virus, pandemic influenza, Ebola, Middle East Respiratory Syndrome (MERS), tuberculosis, COVID-19, hepatitis A, and pertussis (also known as whooping cough).*

Vulnerability

Weather and climate have significant effects on both human and animal help. With changes in climate, the frequency, severity, duration, and location of weather and climate phenomena, changes should be expected, such as rising temperatures, heavy rains, and droughts. Changes in weather and climate can affect health by changing the severity and/or frequency of health problems that are already in play, and by creating unanticipated or unforeseen health problems or threats that have not previously existed.

Many communicable diseases are transmitted by vectors, such as mosquitoes, ticks, and fleas. Vectors can transmit an array of pathogens, such as viruses, bacteria, and protozoa, that can cause illness in humans (or humans and animals). The seasonality and prevalence, as well as distribution patterns, of vector-borne illnesses are influenced by climate factors, such as temperature and humidity. It is anticipated that changes in climate may have both short-term and long-term effects on both vector-borne disease transmissions and infection patterns. This will affect seasonal risk and possibly lead to broad geographic changes in disease patterns over time. Because of the number of factors involved in predicting how changes in climate may impact communicable disease transmission, it is difficult to predict how, exactly, climate change will impact vector-borne illness transmission.

In addition, it is possible that changes in climate may allow or encourage the emergence of new or significantly altered illnesses, heretofore unknown to the medical community.

The hazard ranking for communicable disease is based primarily on the population count and population density for each jurisdiction. No geographic extent data was available for probability estimation; each jurisdiction was assigned a value of low (1) for ranking purposes. Property and crop damages were ranked as low for this hazard, as the hazard is unlikely to impact property and crops. Injuries and fatalities and events were estimated as medium (3) for all jurisdictions, to account for each jurisdiction's susceptibility to communicable disease. The parameters in the communicable disease risk assessment are described in the following table, along with the total ranking.

Locality	Population Vulnerability	Population Density	Injuries & Fatalities	Property Damage	Crop Damage	Events	Geographic Extent	Total Risk Ranking
Essex	Low	Low	Medium	Low	Low	Medium	Low	Medium-Low
Gloucester	Medium	Medium	Medium	Low	Low	Medium	Low	Medium-Low
King William	Low	Low	Medium	Low	Low	Medium	Low	Medium-Low
King & Queen	Low	Low	Medium	Low	Low	Medium	Low	Medium-Low
Mathews	Low	Medium	Medium	Low	Low	Medium	Low	Medium-Low
Middlesex	Low	Medium	Medium	Low	Low	Medium	Low	Medium-Low

Impact

The Virginia Department of Health (VDH) tracks reportable diseases throughout the Commonwealth and provides data on the top communicable illnesses by county for 2018 (the most recent year for which data are available). Figure 27 to 32 provides the incidence rate for the top ten communicable diseases across Middle Peninsula localities.

Figure 27: Within Essex County, Salmonellosis was the most frequently reported disease with 2 cases. This equates to a rate of 18.1 cases per 100,000 population (VDH, 2021).

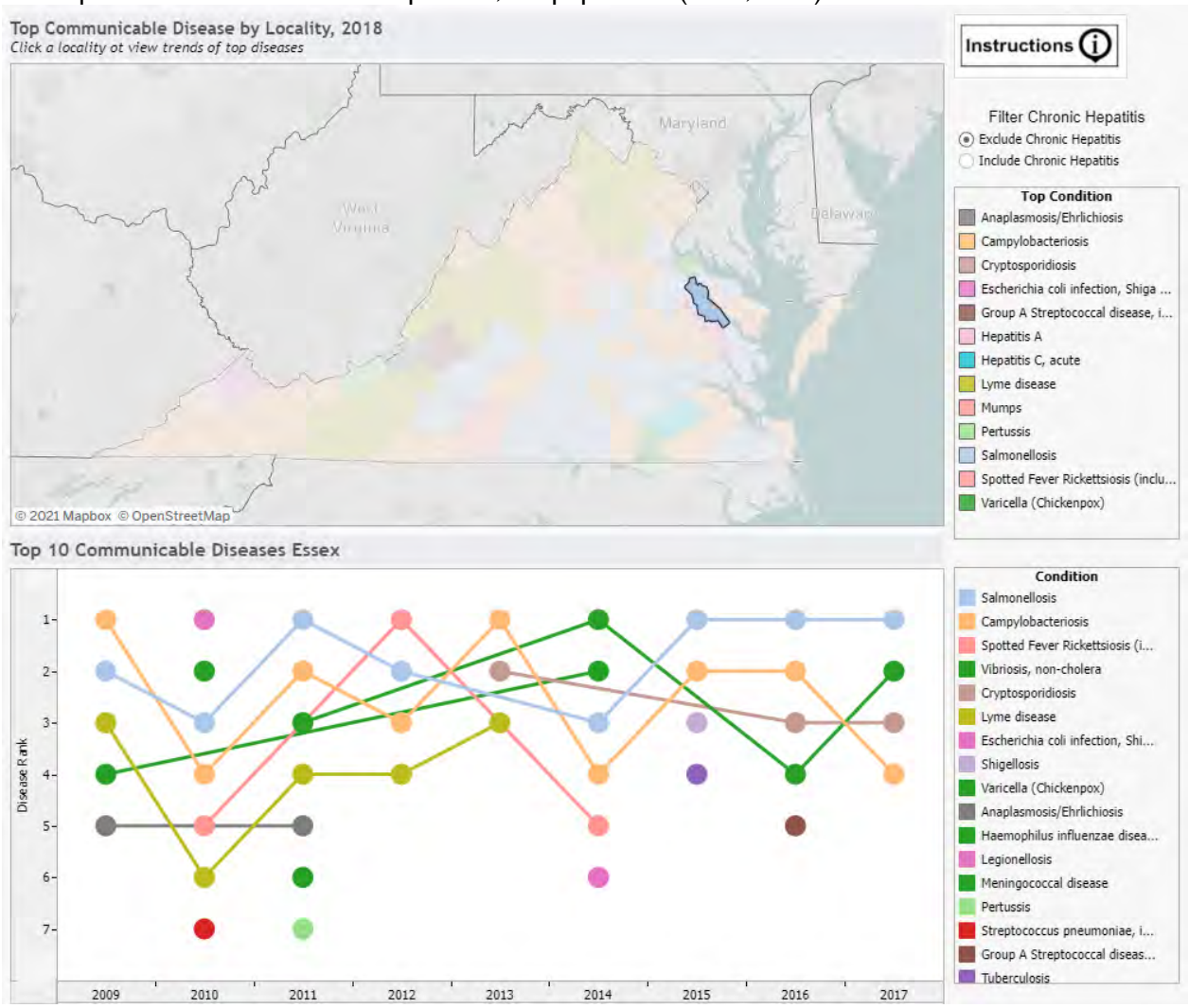


Figure 28: Within King & Queen County, Escherichia coli infection, Shiga Toxin-Producing was the most frequently reported disease with 2 cases. This equates to a rate of 28.6 cases per 100,000 population (VDH, 2021).

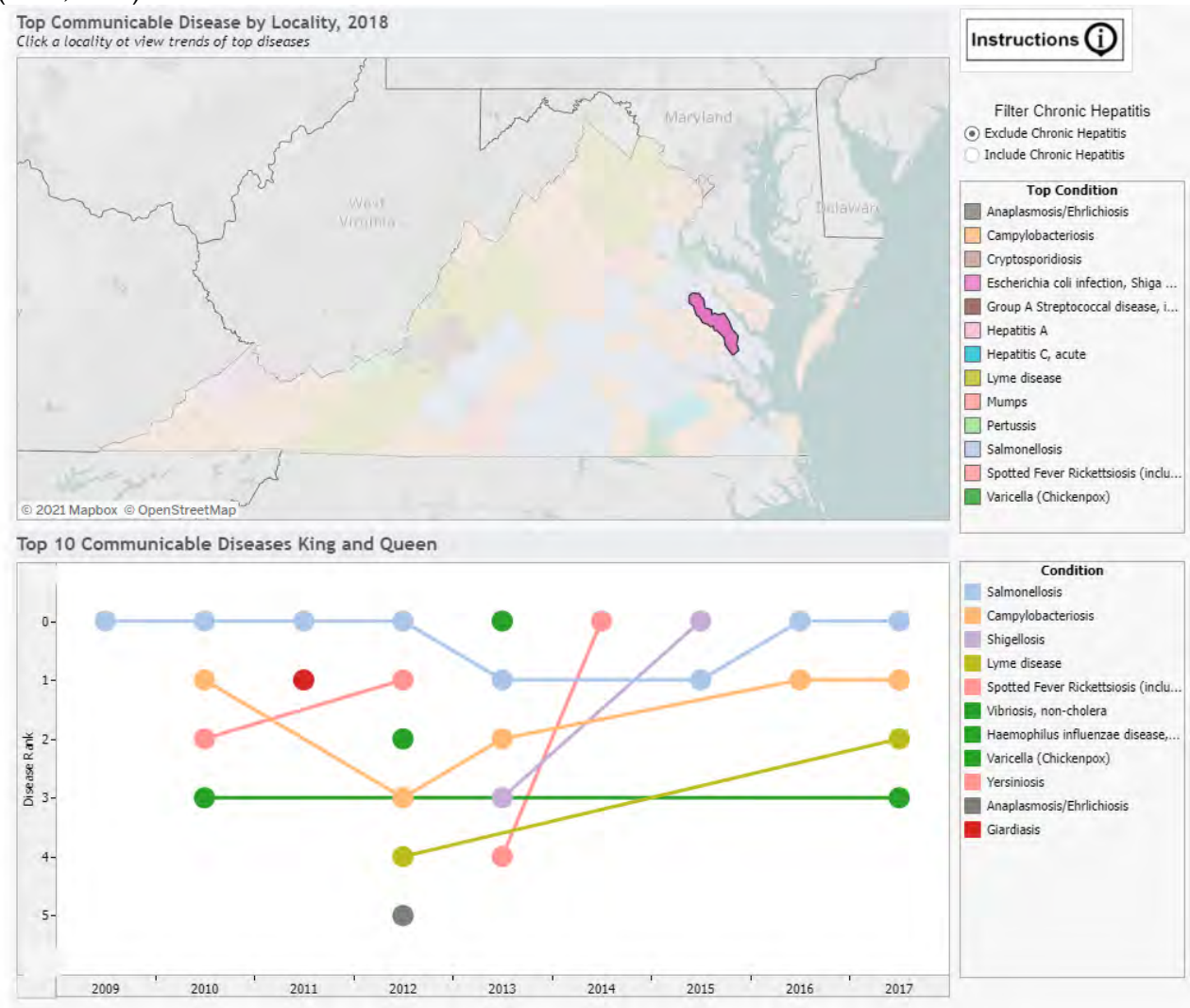


Figure 29: Within King William County, Campylobacteriosis was the most frequently reported disease with 7 cases. This equates to a rate of 41.9 cases per 100,000 population (VDH, 2021).

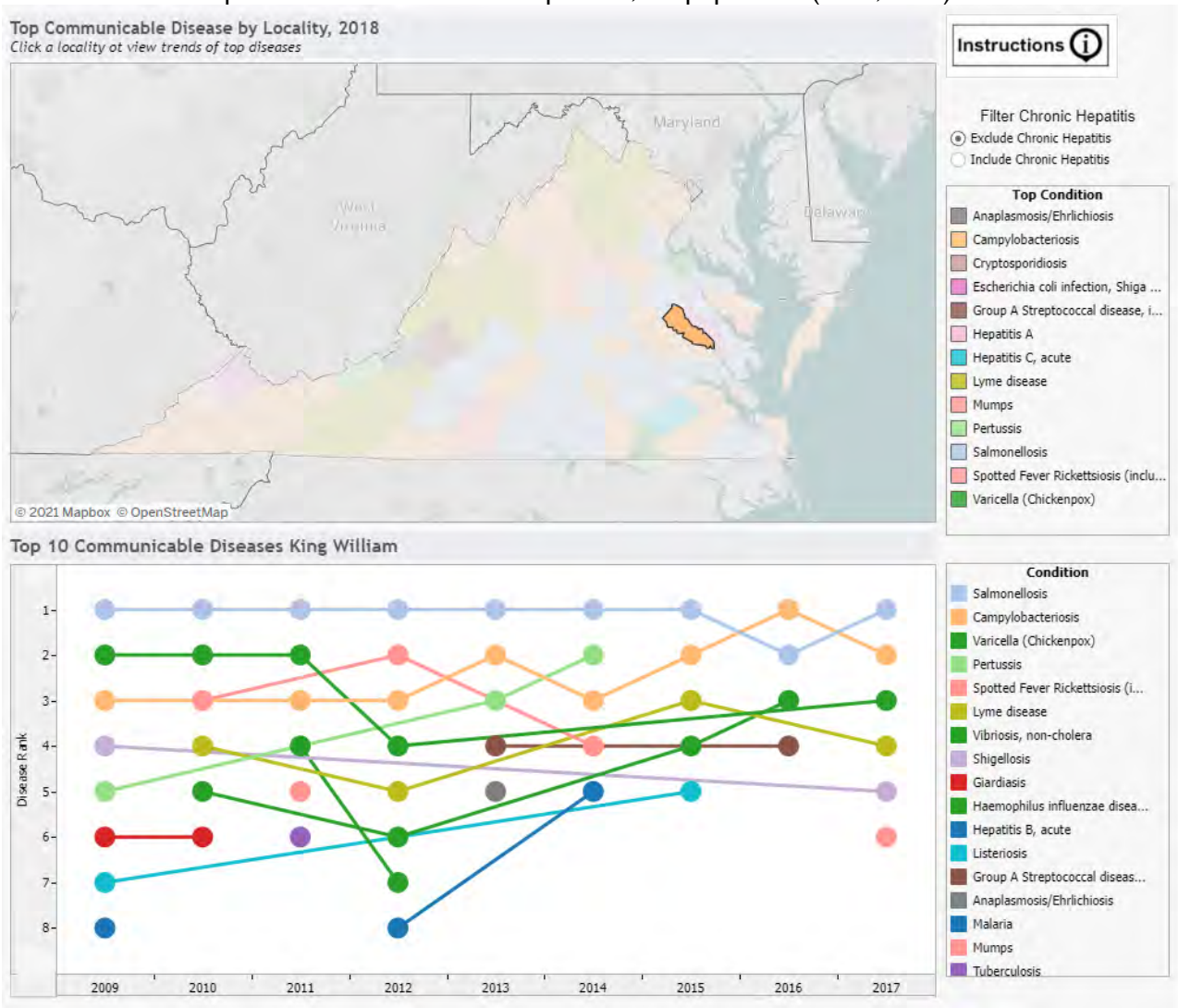


Figure 30: Within Gloucester County, Salmonellosis was the most frequently reported disease with 12 cases. This equates to a rate of 32.2 cases per 100,000 population (VDH, 2021).

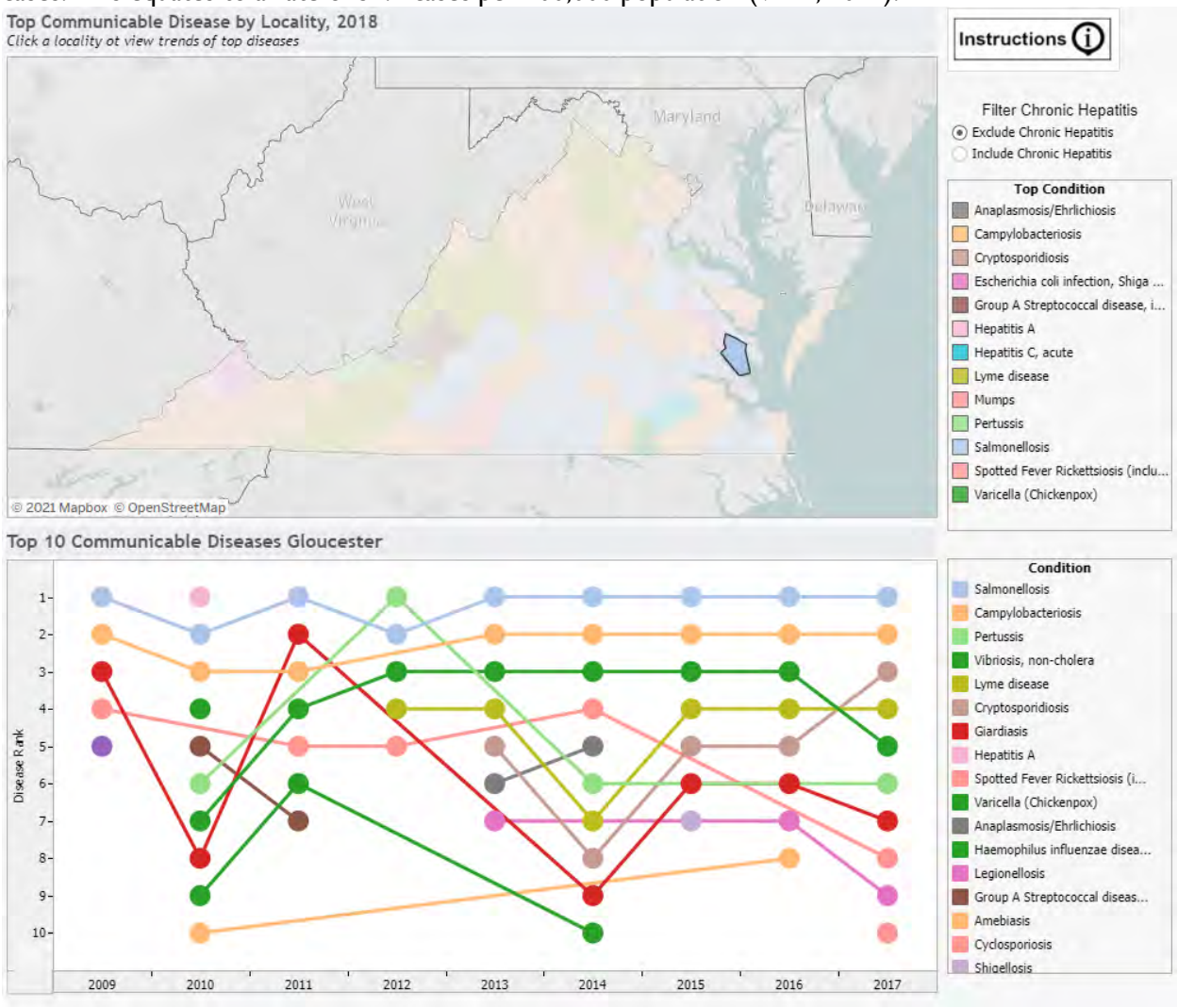


Figure 31: Within Mathews County, Salmonellosis was the most frequently reported disease with 4 cases. This equates to a rate of 45.6 cases per 100,000 population (VDH, 2021).

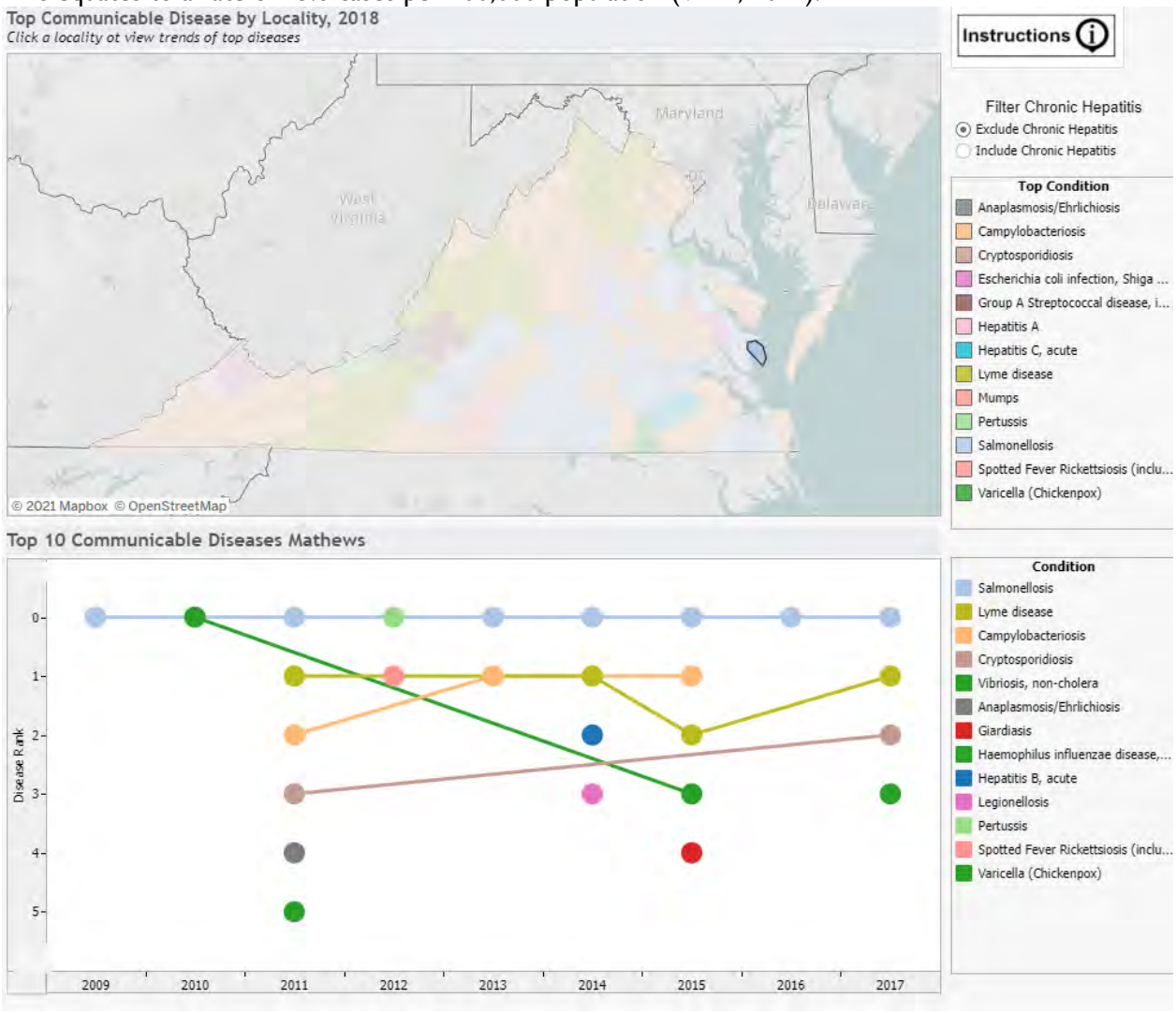
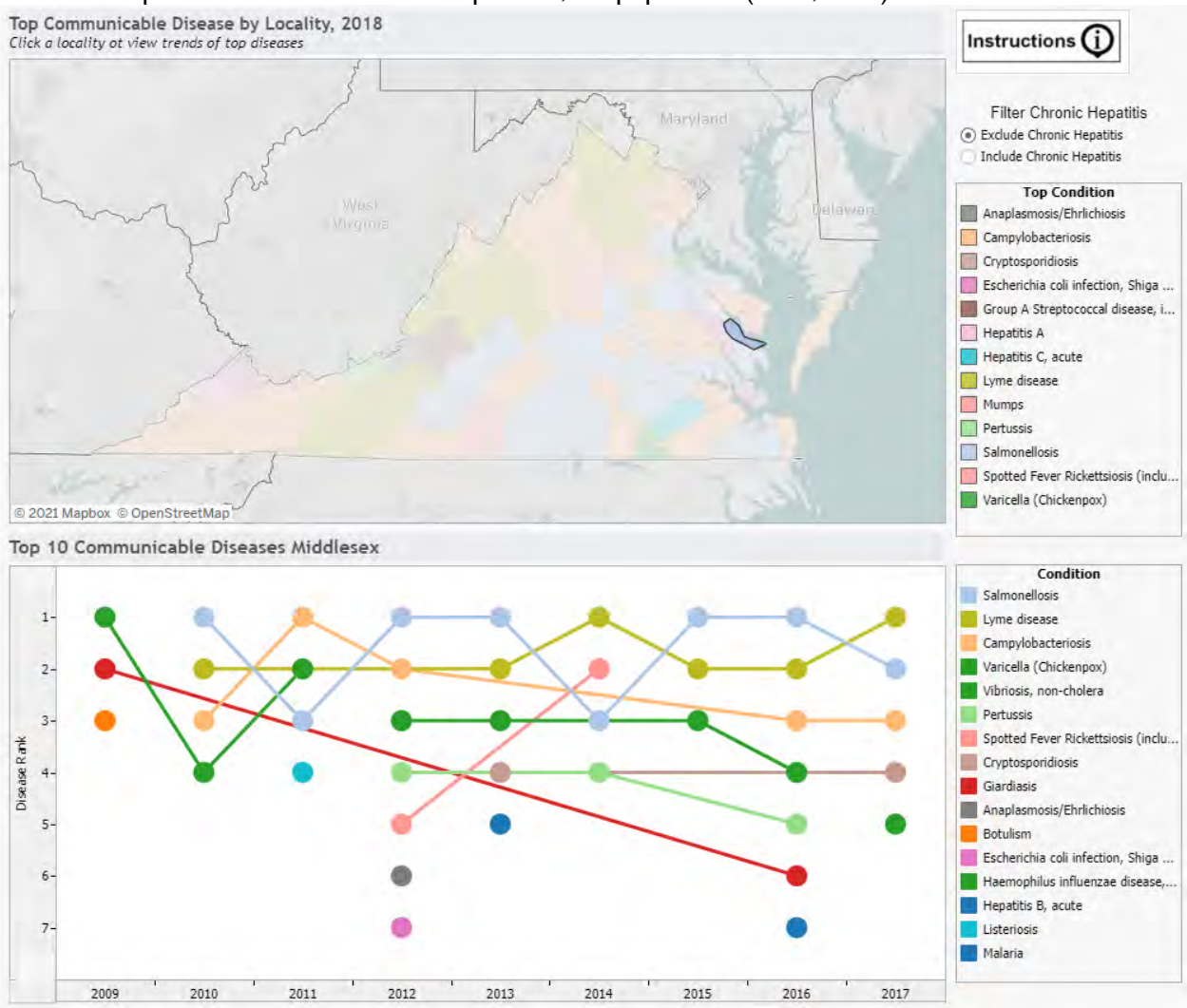


Figure 32: Within Middlesex County, Salmonellosis was the most frequently reported disease with 5 cases. This equates to a rate of 46.8 cases per 100,000 population (VDH, 2021).

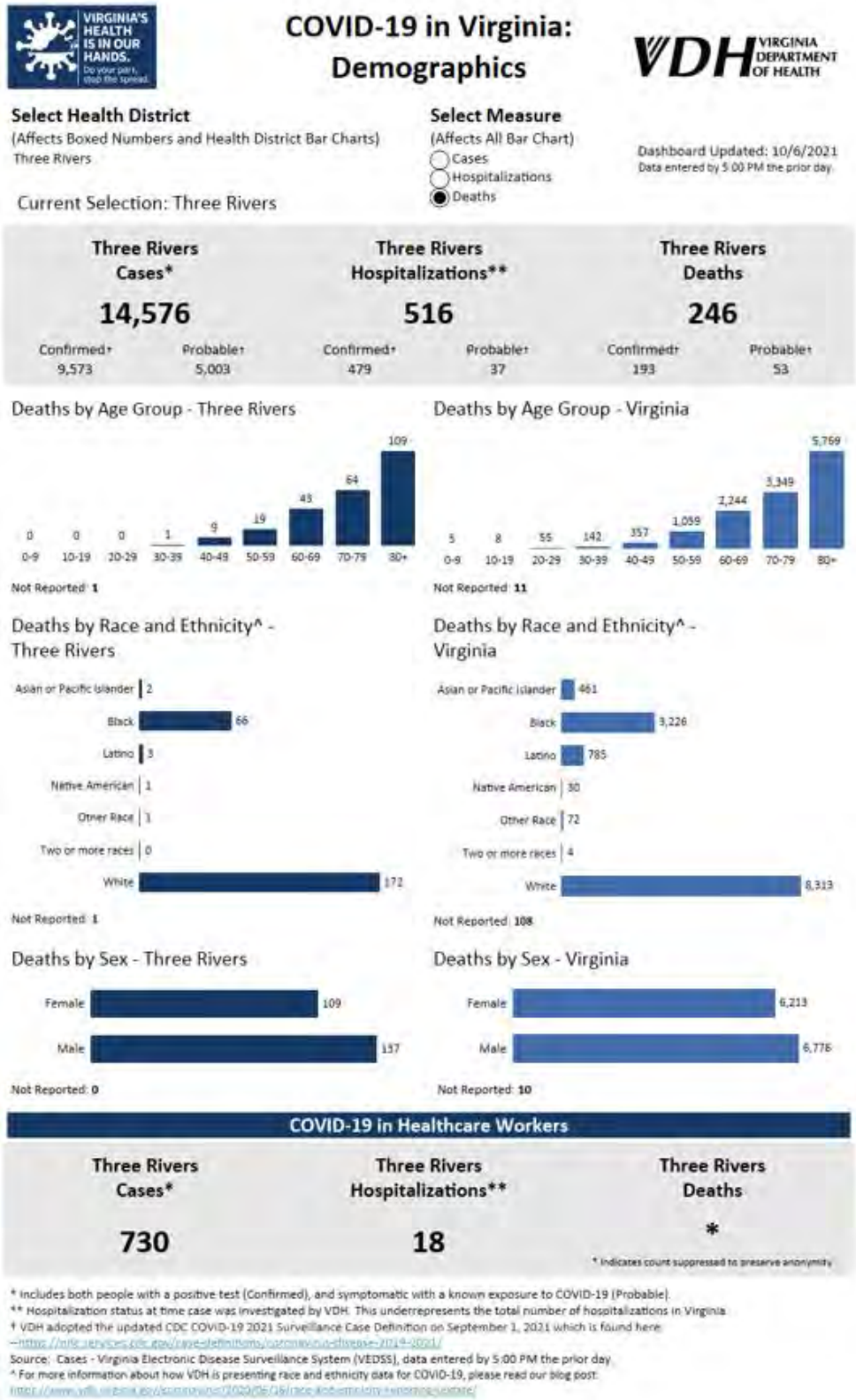


In early 2020, Coronavirus disease (COVID-19) surfaced and grew to pandemic proportions for the entire world. According to the World Health Organization (2021), *COVID-19 is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. Older people and those with underlying medical conditions like cardiovascular disease, diabetes, chronic respiratory disease, or cancer are more likely to develop serious illness. Anyone can get sick with COVID-19 and become seriously ill or die at any age.*

The Three Rivers Health District in Virginia includes Middle Peninsula Localities and Northern Neck Localities. Based on VDH data of the pandemic, Three Rivers Health District recorded the following cases during pandemic:


VIRGINIA'S HEALTH IS IN OUR HANDS. Do your part, stop the spread.
COVID-19 in Virginia: Demographics
VDH VIRGINIA DEPARTMENT OF HEALTH
Select Health District
(Affects Boxed Numbers and Health District Bar Charts)
Three Rivers
Select Measure
(Affects All Bar Chart)
Cases
Hospitalizations
Deaths
Dashboard Updated: 10/6/2021
Data entered by 5:00 PM the prior day.
Current Selection: Three Rivers
Three Rivers Cases*
14,576
Confirmed†
9,573
Probable†
5,003
Three Rivers Hospitalizations**
516
Confirmed†
479
Probable†
37
Three Rivers Deaths
246
Confirmed†
193
Probable†
53
Cases by Age Group - Three Rivers
814
1,758
2,272
2,296
1,891
2,190
1,649
1,005
657
0-9
10-19
20-29
30-39
40-49
50-59
60-69
70-79
80+
Not Reported: 44
Cases by Age Group - Virginia
53,533
104,766
163,631
142,155
123,956
118,294
80,830
43,346
29,147
0-9
10-19
20-29
30-39
40-49
50-59
60-69
70-79
80+
Not Reported: 22,779
Cases by Race and Ethnicity^ - Three Rivers
Asian or Pacific Islander 64
Black 3,332
Latino 550
Native American 38
Other Race 310
Two or more races 96
White 8,305
Not Reported: 1,905
Cases by Race and Ethnicity^ - Virginia
Asian or Pacific Islander 31,014
Black 167,255
Latino 104,689
Native American 1,334
Other Race 25,208
Two or more races 9,251
White 397,714
Not Reported: 145,972
Cases by Sex - Three Rivers
Female 7,438
Male 7,051
Not Reported: 87
Cases by Sex - Virginia
Female 455,587
Male 420,369
Not Reported: 6,481
COVID-19 in Healthcare Workers
Three Rivers Cases*
730
Three Rivers Hospitalizations**
18
Three Rivers Deaths
*
* Indicates count suppressed to preserve anonymity
* Includes both people with a positive test (Confirmed), and symptomatic with a known exposure to COVID-19 (Probable).
** Hospitalization status at time case was investigated by VDH. This underrepresents the total number of hospitalizations in Virginia.
† VDH adopted the updated CDC COVID-19 2021 Surveillance Case Definition on September 1, 2021 which is found here:
Source: Cases - Virginia Electronic Disease Surveillance System (VEDSS), data entered by 5:00 PM the prior day
^ For more information about how VDH is presenting race and ethnicity data for COVID-19, please read our blog post:

Three Rivers Health District also recorded deaths during the pandemic:



To summarize Middle Peninsula data, Table 23 shows covid-19 cases, hospitalizations, and deaths from March 2020 to the present (October 2021).

Table 23: Covid-19 cases, hospitalizations, and deaths within the Middle Peninsula region of Virginia.

Locality	Cases	Hospitalizations	Deaths
Essex County	1,167	55	15
Gloucester County	3,712	87	64
King & Queen County	592	39	8
King William County	1,808	68	22
Mathews County	863	29	19
Middlesex County	909	32	27
Total	9,051	310	155

In an effort in curb the spread of COVID-19 the Center of Disease Control has been encouraging vaccination. Table 24 shows the Middle Peninsula regional vaccination summary (from Spring 2020 to October 2021).

Table 24: Middle Peninsula Regional summary of vaccinated populations (VDH, 2021).

	Essex Co.	Gloucester Co.	King & Queen Co.	King William Co.	Mathews Co.	Middlesex Co.	Regional Total
Vaccine Doses Administered:	11,826	39,637	6,994	17,373	10,111	12,402	98,343
People With At Least One Dose:	6,342	21,306	3,824	9,381	5,371	6,676	52,900
People Fully Vaccinated:	5,825	19,481	3,487	8,545	4,932	6,112	48,382
At Least One Dose Rate per 100,000:	57,902	57,047	54,434	54,706	60,799	63,088	
Fully Vaccinated Rate per 100,000:	53,182	52,161	49,637	49,831	55,830	57,758	
Percent of the Population with At Least One Dose:	57.90%	57.00%	54.40%	54.70%	60.80%	63.10%	
Percent of the Population Fully Vaccinated:	53.20%	52.20%	49.60%	49.80%	55.80%	57.80%	
Percent of the Adult Population with At Least One Dose:	67.10%	67.60%	63.00%	66.30%	69.50%	71.80%	
Percent of the Adult Population Fully Vaccinated:	62.00%	62.00%	57.60%	60.70%	64.00%	66.00%	

4.4.5. Flooding

There are variety of flooding sources impacting Middle Peninsula localities, including stormwater, riverine flooding, coastal flooding, and ditch flooding. Flooding is partial or complete inundation of normally dry land areas.

Riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snowmelt, or ice. This type of flooding is different from *coastal flooding*, which is caused by storm surge and wave action and affects coastal areas, especially those along the beachfront. There are several types of riverine floods, including headwater, backwater, interior drainage, and flash flooding. Flash flooding is characterized by rapid accumulation or runoff of surface waters from any source. This type of flooding impacts smaller rivers, creeks, and streams and can occur because of dams being breached or overtopped. Because flash floods can develop in a matter of hours, most flood-related deaths result from this type of event.

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal water course, some of the above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river. The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

The major rivers of the Middle Peninsula are tidal in nature, serving as estuarine tributaries of the Chesapeake Bay. Flood hazard varies by locality and type of flooding. Riverine flooding is more of a threat to mountainous regions, where population areas typically lie in narrow valleys, which lack the ability to store and dissipate large amounts of water. Consequently, stream flow tends to increase rapidly.

Riverine flooding was addressed during the flood mitigation planning process and mitigation strategies in this update will include:

1. Continuing to maintain and enforce a strong NFIP,
2. Investigating the feasibility of undertaking a FEMA-promoted Community Rating System (CRS) for enhanced floodplain protection policies, and
3. Actively promoting public education programs about development in and adjacent to areas with a history of flooding from rivers and creeks.

4.4.5-1 Riverine Flooding

As riverine flooding is defined as the overflow of rivers, streams, drains, and lakes due to excessive rainfall, rapid snow melt, rapid ice melt or a combination of all three and this type of flooding involves the partial or complete inundation of normally dry land areas. If differs from coastal flooding, which is caused by a combination of rain, storm surge and wave action and affects coastal areas, especially those along the beachfront.

Approximately 60% of Virginia's river flooding begins with flash flooding from tropical systems passing over or near the state. Riverine flooding also occurs because of successive rainstorms. Rainfall from any one storm may not be enough to cause a problem, but with each successive storm's passage over the basin, rivers rise until eventually they overflow their banks. If this occurs in late winter or spring, melting snow in the mountains can produce additional runoff that can compound flooding problems.

There are several types of riverine flooding including headwater, backwater, interior drainage, and flash flooding:

Headwater flooding results from significant rain events that occur at the upper reaches of a watershed that then flow downstream within a short period of time.

Backwater flooding results when the lower portion of a river or stream is blocked by debris or backed up due to a storm surge along the coast.

Interior drainage flooding results when a dam gives way and the water being held in the impoundment is released all at once to the downstream receiving channel.

Flash flooding is characterized by rapid accumulation and runoff of surface waters from any source. This type of flooding impacts smaller rivers, creeks, and streams and can occur because of dams being breached or overtopped. Because flash floods can develop in a matter of hours, most flood-related deaths result from this type of event.

Although flash flooding is more of a threat in the steeper mountainous regions of the state where population areas typically lie in narrow valleys that lack the ability to store and dissipate large amounts of water, some of the hilly areas in the upper reaches of the Middle Peninsula watersheds can experience rapid increase in stream flow resulting in some riverine flooding and subsequent threats to life and property.

Periodic flooding of lands adjacent to non-tidal rivers and streams is a natural and inevitable occurrence. When stream flow exceeds the capacity of the normal water course, some of the above-normal stream flow spills over onto adjacent lands within the floodplain. Riverine flooding is a function of precipitation levels and water runoff volumes within the watershed of the stream or river.

The recurrence interval of a flood is defined as the average time interval, in years, expected to take place between the occurrence of a flood of a particular magnitude and a second one of equal or greater magnitude. Flood magnitude increases with increasing recurrence interval. The interval most referred to and also the basis for many local government regulations is known as the 100-year flood or storm event.

The major rivers in the lower Middle Peninsula are tidal in nature and they serve as estuarine tributaries of the Chesapeake Bay. Flood hazards vary due to the river's location and the type of storm event taking place.

Riverine Flooding Vulnerability

Populations and property are extremely vulnerable to flooding. Homes business, public buildings and critical infrastructure may suffer damage and be susceptible to collapse due to heavy flooding. Floodwaters can carry chemicals, sewage, and toxins from roads, factories, and farms; therefore any property affected by the flood may be contaminated with hazardous materials. Debris from vegetation and man-made structures may also be hazardous following the occurrence of a flood. In addition, floods may threaten water supplies and water quality, as well as initiate power outages, and create health issues such as mold.

Riverine Flooding Extent (Impact)

The FEMA Special Flood Hazard Area designations area associated with the probability of flooding (Table 25).

Table 25: FEMA Flood Zone Designations and probabilities (VDEM, 2013).	
Zone V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined
Zone VE	Coastal flood zone with velocity hazard (wave action); wave heights above 3 feet; Base Flood Elevations determined.
Zone A	100 Year flood area (1% annual change of flood). Base Flood Elevations determined.
Zone AE	100-year flood area (1% annual chance of flood). Base Flood Elevations determined.
Zone AO	Subject to 100-year shallow flooding with flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); Base Flood Elevations undetermined
Zone X	Areas with 0.2% annual chance of flood or less; areas in 100-year flood zone with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.
Zone X500	The same description as Zone X, however, this area falls between the 100 and 500-year flood zone.
UNDES	Area in which flood hazards are undetermined.

4.4.5- 2 Ditch Flooding

As per the Commonwealth of DEQ Guidance Memorandum No. 08-2004 Regulation of Ditches under the Virginia Water Protection (VWP) Program, ditch is defined as a linear feature excavated for the purpose of draining or directing surface or groundwater. Ditches may also be constructed to collect groundwater or surface water for the purposes of irrigation.

Ditch Flooding Vulnerability

Throughout the Middle Peninsula of Virginia, the network of aging roadside ditches and outfalls, serving 670 miles of roads, creates the region's primary stormwater conveyance system. Currently each locality in the region experiences inadequate drainage and as a result, roads and private properties are frequently flooded after a storm event. The lowest lying localities (ie. Mathews and Gloucester County) are more vulnerable to ditch flooding as most of their land is either at or slightly above sea level. This low topography and lack of grade does not assist the flow of water out of areas. Therefore, roadway flooding frequently cuts residents and business off from the county and emergency services for extended periods of time. Flooding has also caused the county school system to be closed due safety concerns. Flooding, risks to public health and safety, property damage, and long-term loss of property use and values are consequences of the inadequate drainage systems, all of which ultimately negatively impact the economy of the Middle Peninsula.

Conditions contributing to the failure of the drainage system, include, but are not limited to, the following:

1. A lack of maintenance, including removal of sediment and overgrown vegetation, causing slopes to be inadequate or reverse slope and/or tides not allowed to recede;
2. Insufficient elevation change (topographic constraints);
3. Cross-culverts are filled with sediment, not adequately maintained, damaged, and/or installed with an inadequate / reverse slope;
4. Unclear ownership and ditch maintenance responsibility (VDOT or private);
5. Sea level rise; and
6. Land subsidence.

When high exposure to hurricanes, nor'easters, tropical storms, sea level rise, and land subsidence is coupled with clogged roadside ditches and outfalls, illicit filling of the ditches on private property, and/or failing ditches,

there are significant social, economic, and environmental impacts.

Ditch Flooding Extent (Impact)
Ditch flooding is currently measured through observations. Currently in Mathews County a citizen group records observations and takes photos of the ditch flooding. Additionally in 2015 the Draper Aden Associated partnered with Mathews County to develop a Stormwater Ditch Steering Committee that consisted of private citizens, VDOT, and MPPDC representatives. Areas within Mathews were selected to focus on that were prone to ditch flooding and were called priority areas. These priority areas were visited, and existing conditions were noted. Based on findings in the field, DAA provided site recommendations to improve the given ditch as well as associated costs of the improvements. This information will be the basis of a roadside ditch database underdevelopment in 2016.

4.4.5-3 Coastal Flooding

According to the Commonwealth of Virginia Hazards Mitigation Plan coastal flooding occurs when strong onshore winds push water from an ocean, bay or inlet onto the land. In addition, coastal areas experience flooding from overland flow, ponding and inadequate storm water drainage. Coastal flooding may arise from tropical cyclones (hurricanes and tropical storms) or Nor'easters (extra tropical storms).

Flooding is the most frequent and costly natural hazard in the United States - besides fire. Nearly 90% of Presidential Disaster Declarations result from natural events where flooding is a major component. Excess water from snowmelt, rainfall, or storm surge accumulates and overflows onto adjacent floodplains and other low-lying land adjacent to rivers, lakes, ponds and the Chesapeake Bay. Based on data

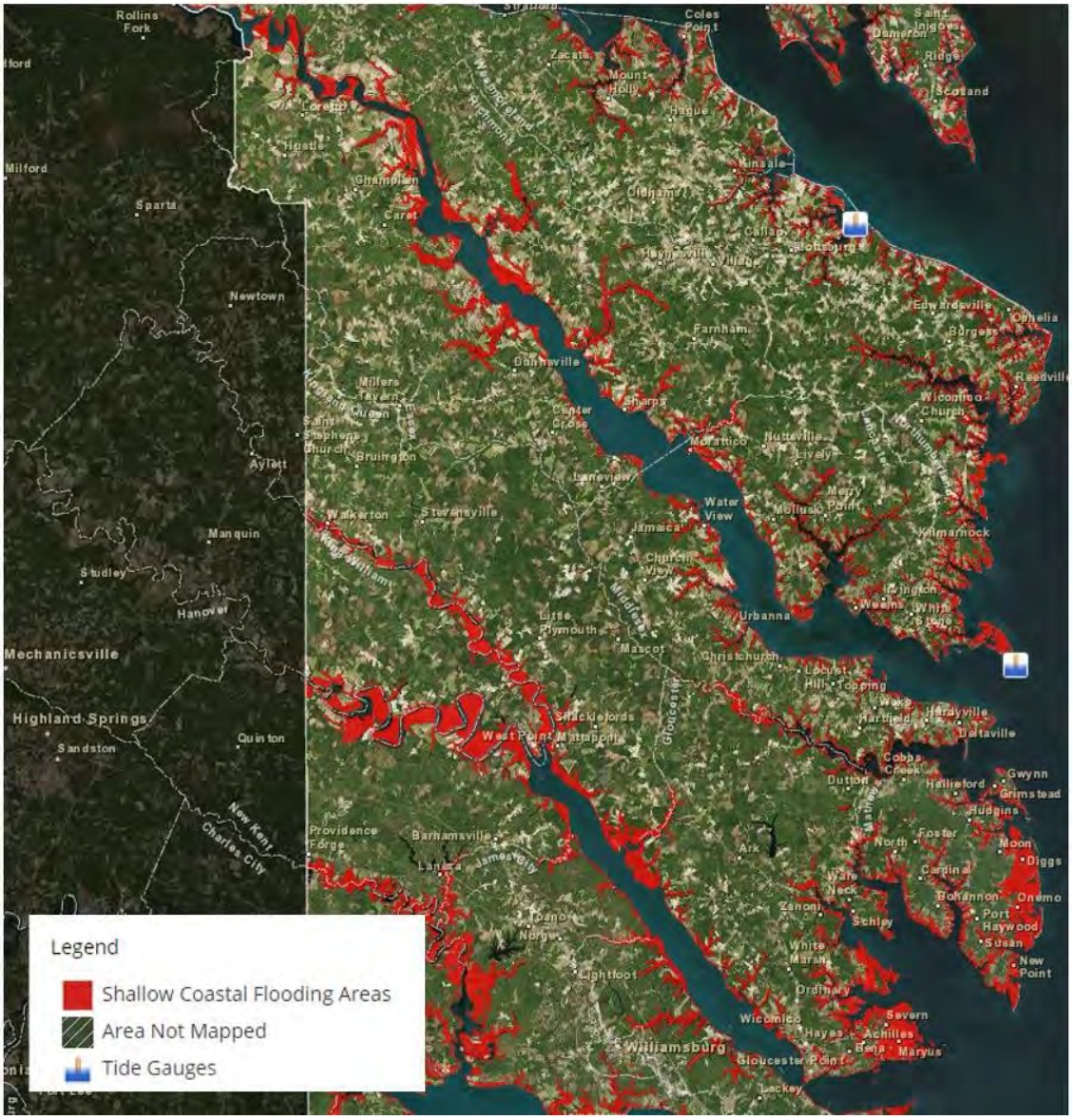
Coastal flooding is typically a result of storm surge, wind-driven waves, and heavy rainfall. These conditions are produced by hurricanes during the summer and fall, and nor'easters and other large coastal storms during the winter and spring. Storm surges may overrun barrier islands and push sea water up coastal rivers and inlets, blocking the downstream flow of inland runoff.

Coastal Flooding Vulnerability
Thousands of acres of crops and forest lands may be inundated by both saltwater and freshwater. Escape routes, particularly from barrier islands, may be cut off quickly, stranding residents in flooded areas and hampering rescue efforts. Coastal flooding is very dangerous and causes the most severe damage where large waves are driven inland by the wind. Wind driven waves destroy houses, wash away protective dunes, and erode the soil so that the ground level can be lowered by several feet. Because of the coastal nature of the Middle Peninsula, the region is very susceptible to this type of flooding and resulting damage.

Based on NOAA's Coastal Management Digital Coast Database frequent shallow flooding occurs in the Middle Peninsula region. As many coastal areas experience periodic mini-to-moderate shallow coastal flooding events – typically as result of meteorological factors that include high tides, winds, and rain. Figure 33 is a map of the Middle Peninsula showing the areas impacting the coastal areas. One can see that there is varying degree of impact amongst Middle Peninsula localities.

Figure 33:

Frequent Shallow Coastal Flooding in Middle Peninsula Virginia (NOAA, 2015)



Coastal Flooding Extent (Impacts)

To help identify coastal flooding, FEMA will conduct engineering studies referred to as Flood Insurance Studies (FISs). Using the information gathered in these studies, FEMA engineers and cartographers delineate Special Flood Hazard Areas (SFHAs) on flood maps. SFHA are subject to inundation by a flood that has a 1-percent or greater chance of being equaled or exceeded in any given year. This type of flood is commonly referred to as the 100-year flood or base flood. A 100-year flood is not a flood that occurs every 100 years. In fact, the 100-year flood has a 26 percent chance of occurring during a 30-year period, the length of many mortgages. The 100- year flood is a regulatory standard used by Federal agencies and most states,

to administer floodplain management programs. The 100-year flood is also used by the NFIP as the basis for insurance requirements nationwide.

4.4.5-4 Stormwater Flooding

Storm water can be a cause of or a contributing factor to flash or urban flooding. Flooding increases as solid surfaces replace permeable surfaces or natural green spaces, as storm water is unable to filter into the landscape. Storm water deposits sediment that decreases the depth and flow capacity of waterways (natural and manmade), further increasing flooding. Storm water runoff flooding is most evident in areas where urbanization has occurred. Changes in land use have a major impact on both the quantity and quality of storm water runoff. Impervious cover decreases the amount of rainwater that can naturally infiltrate into the soil, thereby increasing the volume and rate of storm water runoff.

Stormwater may enter surface waters directly or through natural and constructed channel systems. Pollution, such as automobile oil, grease, metals, sediment, bacteria from animal waste, fertilizers, and pesticides, even deposits from airborne pollutants can contaminate the runoff.

Unmanaged stormwater can cause erosion and flooding. It can also carry excess nutrients, sediment and other contaminants into rivers and streams. Properly managed stormwater can recharge groundwater and protect land and streams from erosion, flooding, and pollutants.

Within the Middle Peninsula, roadside ditches are the region's stormwater conveyance system. Therefore, high water tables, clogged roadside ditches or unmaintained ditches may not be adequate to move water away from roads or infrastructure.

Stormwater Vulnerability

As climate change is expected to create more severe storms this means more water to manage. Therefore, as mentioned previously, when high exposure to hurricanes, nor'easters, tropical storms, sea level rise, and land subsidence is coupled with clogged roadside ditches and outfalls, illicit filling of the ditches on private property, and/or failing ditches and high water tables, there are significant social, economic, and environmental impacts.

Stormwater Extent (Impact)

The entire region is impacted by stormwater; however, those localities and communities that are lower in elevation and/or have a higher water table will experience more impacts to flooding due to stormwater since the water has nowhere to go.

Buildings are in danger from hydrostatic loads, which occur when flood waters come into contact with a building, its foundation, or a building element. Inadequately elevated buildings on shallow foundations are most in danger from vertical hydrostatic forces (buoyancy or flotation). Such buildings are vulnerable to uplift from flood and wind forces because the weight of a foundation or building element is much less when submerged than when not submerged (FEMA Coastal Construction Manual, 2011). Hydrodynamic loads are a function of flow velocity and structural geometry and can destroy walls, push structures off foundations, and carry sediment and debris (FEMA Coastal Construction Manual, 2011).

In addition to stormwater impacts on infrastructure, stormwater may also impact agriculture. If water sits on agricultural fields for too long periods, this could decrease crop yields.

Middle Peninsula Resources at Potential Risk of Loss
Floodplain Properties and Structures
While floodplain boundaries are officially mapped by FEMA's National Flood Insurance Program (NFIP), flood waters sometimes go beyond the mapped floodplains and/or change courses due to natural processes (e.g., accretion, erosion, sedimentation, etc.) or human development (e.g., filling in floodplain or floodway areas, increased imperviousness areas within the watershed from new development, or debris blockages from vegetation, cars, travel trailers, mobile homes, and propane tanks).

Since the floodplains in the United States are home to over 9 million households and there continues to be a high demand for residential and commercial development along water features, most property damage results from inundation by sediment and debris-filled water. Flooding is one of the most significant hazards faced by the Middle Peninsula. A majority of the flooding that has damaging effects on the region is tidal flooding, which primarily occurs in conjunction with severe coastal storms such as hurricanes or nor'easters.

In addition to tidal flooding, some regions of the Middle Peninsula are subject to flooding events induced by rain associated with a hurricane or a tropical storm, which can produce extreme amounts of rainfall in short periods of time. In August 2004, Tropical Storm Gaston dumped 14 inches of rain in a matter of hours on King William County, washing out numerous roads and bridges. This storm qualified the county for disaster aid through a Presidential Disaster Declaration.

Flooding of vacant land or land that does not have a direct effect on people or the economy is generally not considered a problem. Flood problems arise when floodwaters cover developed areas, locations of economic importance, infrastructure, or any other critical facility. Low-lying land areas of Essex, Gloucester, Mathews, and Middlesex Counties and the lower reaches of King and Queen and King William Counties are highly susceptible to flooding, primarily from coastal storm when combined with tidal surges.

These flood-prone regions include marsh areas adjacent to waterways, and the wide, flat outlets where its streams and rivers meet the Chesapeake Bay and its tributaries. Fluctuations in the surrounding water levels produce a mean tidal range of approximately 3 feet. The timing or coincidence of maximum surge-producing forces with the normal high tide is an important factor in consideration of flooding from tidal sources. Strong winds from the east or southeast can push Chesapeake Bay water into the mouth of the York and Rappahannock Rivers and Mobjack Bay – thereby flooding lower portions of the Middle Peninsula. This surge combined with the normal high tide can increase the mean water level by 15 feet or more.

The Flood Insurance Rate Maps (FIRMs) show flooding during a 100-year storm event or, in other words, the storm that has a 1% chance of being equaled or exceeded in any given year. The FIRMs account for both coastal surge driven flooding, as well as flooding generated from rain events. The 1% annual-chance-flood (or the 100-year flood as it is commonly referred to) represents a magnitude and frequency that has a statistical probability of being equaled or exceeded in any given year. Another way of looking at it is that the 100-year flood has a 26% (or a 1 in 4) chance of occurring over the life of a 30-year mortgage on a home (FEMA, 2002).

Along with nearly 20,000 communities across the country, all of the localities in the Middle Peninsula voluntarily participate in the National Flood Insurance Program by adopting and enforcing floodplain management ordinances in order to reduce future flood damage. In exchange, the NFIP makes federally backed flood insurance available to homeowners, renters, and business owners in these communities (FEMA, 2002).

The U.S. Congress established the National Flood Insurance Program (NFIP) with the passage of the National Flood Insurance Act of 1968. Flood insurance is designed to provide an alternative to disaster assistance to reduce the escalating costs of repairing damage to buildings and their contents caused by floods. Flood damage is reduced by nearly $1 billion a year by communities implementing sound floodplain management requirements and property owners purchasing flood insurance.

Additionally, buildings constructed in compliance with NFIP building standards suffer approximately 80% less damage annually than those not built-in compliance with these standards. It is estimated that for every $3 paid in flood insurance claims, there is $1 spent in disaster assistance payments (FEMA, 2002).

Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed for local floodplain management programs and to provide flood insurance actuarial rates for new construction (FEMA, 2002).

Floodplain maps covering the Middle Peninsula Region have recently been updated. FEMA produced these new digital maps in the following years:

2015
Essex County
Middlesex County

2014
Gloucester County
Mathews County

2013
King & Queen County
King William County

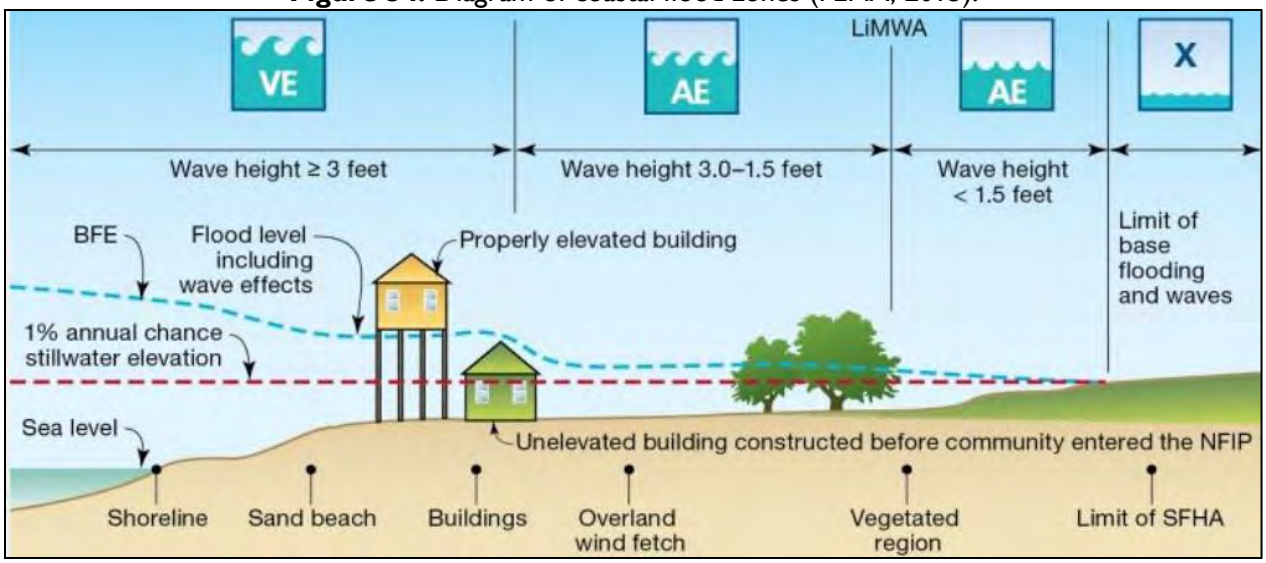
The recently completed digital floodplain maps/data can be integrated into the GIS of those Middle Peninsula localities that utilize GIS technology.

In recent years, FEMA has comprehensively analyzed Region III's coastal flood hazard and integrated the lasted topographic data sets with state-of-the-art storm modeling techniques (FEMA, 2015). This new information replaces maps and studies that are based on data and modeling technology from as far back as the 1970's (FEMA, 2015). With this new data and technology, new FIRMs have been generated. The FIRMs reflect floodplain zones are standardized to the 100-year flood and assigned an area called the Special Flood Hazard Area (SFHA). A SFHA is a high-risk area defined as any land that would be inundated by a flood having a 1-percent chance of occurring in any given year (FEMA, 2002). In the Middle Peninsula, the SFHA includes zones designated as VE, A, Coastal A, AE, AO, X, and X500. Table 25 provides definitions for the zones.

Table 25: FEMA Flood Zone Designations found in the Middle Peninsula Region.	
Zone VE & V	SFHA along coasts subject to inundation by the 100-year flood with additional hazards due to velocity (wave action). Base flood elevations derived from detailed hydraulic analyses are shown within these zones. This delineated flood hazard includes wave heights equal to or greater than three feet. *Mandatory flood insurance purchase requirements apply.*
Zone A	SFHA subject to inundation by the 100-year flood. Because detailed hydraulic analyses have not been performed, no base flood elevation or depths are shown. *Mandatory flood insurance purchase requirements apply.*
Zone AE	SFHA subject to inundation by the 100-year flood determined in a Flood Insurance Study by detailed methods. Base flood elevations are shown within these zones. This delineates flood hazards including wave heights less than three feet. *Mandatory flood insurance purchase requirements apply.*
Zone AO	SFHA inundated by the 100year flood where flooding is anticipated to average depth of 1 to 3 feet, where a clearly defined channel does not exist, where the path of flooding is unpredictable, and where velocity flow may be evident.
Zone X	These areas have been identified in the Flood Insurance Study as areas of moderate or minimal hazard from the principal source of flood in the area. However, buildings in these zones could be flooded by severe, concentrated rainfall coupled with inadequate local drainage systems. Local storm water drainage systems are not normally considered in the community's FIS. The failure of a local drainage system creates areas of high flood risk within these rate zones. *Flood insurance is available in participating communities but is not required by regulation in these zones.*
Zone X500	The same description as Zone X, however, this area falls between the 100 and 500-year flood zone.
UNDES	Undescribed. No information available.

To further assist community official and property owners in recognizing an increased potential for damage due to wave action in the AE zone, FEMA issued guidance in December 2008 on identifying and mapping the 1.5-foot wave high line, referred to as the Limit and Moderate Wave Action (LiMWA) (Figure 34). As LiMWA addresses the fact that wave action does cease at the AE Zone delineate, a new SFHA has been developed between the VE and AE Zone called Zone Coastal A. Zone Coastal A is landward of a V Zone, or land ward of an open coastal without mapped V Zones. While the Coastal A Zone in not a NFIP mandate, it offers design and construction practice for communities that wish to adopt high floodplain management standards. Within the Middle Peninsula, Gloucester County, Mathews County and the Town of West Point are the only locality that has included Coastal A Zone within their FIRMs and floodplain management policy.

Figure 34: Diagram of coastal flood zones (FEMA, 2015).



Under the NFIP regulations, participating NFIP communities are required to regulate all development in the SFHAs. Development is defined as:

> *"any man-made change to improved or unimproved real estate, including but not limited to buildings or other structures, mining, dredging, filling, grading, paving, excavation or drilling operations or storage of equipment or materials."*

Before a property owner can undertake any development in the SFHA, a permit must be obtained from the locality. The locality is responsible for reviewing the proposed development to ensure that it complies with the locality's floodplain management ordinance. Localities are also required to review proposed developments in the SFHAs to ensure that all necessary permits have been received from those governmental agencies from which approval is required by Federal or State law, such as 404 Wetland Permits from the Army Corps of Engineers or permits under the Endangered Species Act.

Under the NFIP, localities must review all new development proposals to ensure that they are reasonably safe from flooding and that the utilities and facilities serving these developments are constructed to minimize or eliminate flood damage.

In general, the NFIP minimum floodplain management regulations require that new construction or substantial improvements to existing buildings in the Zone A must have their lowest floor, including basements, elevated to or above the Base Flood Elevation (BFE). Non-residential structures in Zone A can be either elevated or dry flood proofed. In Zone V, the building must be elevated on piles/columns and the bottom of the lowest horizontal structural member of the lowest floor of all new construction or substantially improved existing buildings must be elevated to or above the BFE.

When the NFIP was created, the U.S. Congress recognized that insurance for "existing buildings" constructed before a community joined the Program would be prohibitively expensive if the premiums were not subsidized by the Federal Government. Congress also recognized that most of these flood-prone buildings were built by individuals who did not necessarily have sufficient knowledge of the flood hazard to make informed decisions.

Under the NFIP, "existing buildings" are generally referred to as pre-FIRM buildings. These buildings were built before the flood risk was known and identified on the locality's FIRM. Currently, about 26% of the 4.3 million NFIP policies in force are pre-FIRM subsidized policies as compared to 70% of the policies that were being subsidized in 1978 (FEMA, 2002).

Middle Peninsula Flood Insurance Data

According to data from DCR dated October 28, 2021, there are a total of 3,399 flood insurance policies covering Middle Peninsula properties (Table 26).

Table 26: Flood Insurance Policies within the Middle Peninsula (DCR, 2021).

Locality	Total Policies	# of Claims Since 1978	Total Value of Claims
Essex	180	223	$5,706,414.53
Tappahannock	59	17	$196,025.24
Gloucester	1416	1336	$29,978,952
King & Queen	50	22	$644,684.83
King William	12	10	$77,367.15
West Point	81	78	$2,288,641.12
Mathews	1225	1145	$20,350,449.48
Middlesex	338	220	$2,939,203.54
Urbanna	38	78	$277,744.64
Totals	3399	3063	$62,459,482.53

Table 27: Repetitive Loss Properties in the Middle Peninsula (DCR, 2021).

County	# of Properties	# of Claims	Total Building Claims	Average Claim
Essex	32	82	$1,855,068.89	$22,622.79
Mathews	169	417	$8,252,285.42	$19,789.65
Gloucester	146	384	$3,310,607.84	$21,642.21
Middlesex	35	78	$1,084,995.57	$13,910.20
Town of Urbanna	2	4	$120,595.91	$30,148.98
Town of Tappahannock	2	4	$66,220.74	$16555.19
Town of West Point	9	21	$644,314.91	$30,681.66

Repetitive loss (RL) properties can define two ways:

1. The NFIP defines Repetitive Loss as 2 or more claims of at least $1000 over a 10-year rolling period. This is the data that appears in this plan (Table 27).
2. The Hazard Mitigation Assistance program defines Repetitive Loss as having incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event; and, at the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

Table 28 shows the number of SRL properties within the Middle Peninsula region.

Table 28: Severe Repetitive Loss Properties in the Middle Peninsula (DCR, 2021).				
County	**# of Properties**	**# of Claims**	**Total Building Payments**	**Average Pay**
Essex	2	9	$142,973.31	$22,884.81
Mathews	11	49	$1,288.909.58	$34,179.62
Gloucester	13	63	$1,857,182.84	$33,028.95
Middlesex	2	6	$157,821.97	$37,271.90

4.5. Locality Specific Critical Facilities and Public Utilities

4.5.1. King and Queen County Critical Facilities and Public Utilities

The County's Courthouse Complex is located in the central portion of the county along the Route 14 ridgeline, which runs in a southeasterly/northwesterly direction. The Complex is the center of county government and contains all county offices. The law enforcement and public safety functions are located in the new courts/administration building, which has a generator that serves these areas of the building during a power outage. The complex is located outside of the 500-year floodplain.

Additional properties that the County owns include 4 solid waste facilities located at 4 different locations throughout the county and the property that the regional library is located on. All 5 of these properties lie outside of the 500-year floodplain.

There are 4 volunteer fire departments (VFD) and 2 volunteer rescue squads (VRS) located at scattered positions throughout the county. All these emergency response facilities are located outside the 500-year floodplain.

The County's 3 school sites are all located along the high and dry Route 14/721 corridor. Central High School, located in the King and Queen Courthouse area in the middle portion of the county, is the County's designated shelter due to flooding or any other type of natural disaster.

The Middle Peninsula Regional Airport is located in the southern portion of the county and is owned and operated by a regional authority. The Airport Authority is made up of 4 local governments including King and Queen, King William and Gloucester Counties as well as the Town of West Point. Life-Evac, a medical transport helicopter service, is located at the airport. The airport terminal and runway are located outside the 500-year floodplain.

There are no public water or sewer facilities anywhere in the County - all properties in the County are served by individual wells and septic systems.

Repetitive and Severe Repetitive Loss Residential Structures in King and Queen County
According to FEMA's records, King and Queen County has no Repetitive Loss residential properties or Severe Repetitive Losses as of 2020.

According to VDOT and County officials, flood prone roads in King and Queen County include the following in Table 29.

Table 29: King and Queen County Flood Prone Roads		
Route	**Road Name**	**Location of Flooding**
749	Kays Lane	At Root Swamp
721	Newtown Road	near Bradley Farm Road
721	Newtown Road	near Level Green Road
721	Newtown Road	near Glebe Road
623	Indian Neck Road	near Rappahannock Cultural Center
625	Poplar Hill Road	near Spring Cottage Road
628	Spring Cottage Road	near Eastern View Road
628	Todds Bridge Road	near Gunsmoke Lane
628	Pattie Swamp Road	at swamp
631	Fleets Mill Road	at Fleets Millpond
631	Norwood Road	at Dickeys Swamp
636	Minter Lane	at Walkerton Creek
620	Powcan Road	at Poor House Lane
620	Duck Pond Road	at Garnetts Creek
634	Mt. Elba Road	at flat areas
633	Mantua Road	at Garnetts Creek
617	Exol Road	at Exol Swamp
614	Devils Three Jump Road	Devils Three Jump Road
14	The Trail	at Truhart
613	Dabney Road	At Little Tastine Swamp
611	Tastine Road	At Little Tastine Swamp
603	Lombardy Road	At Little Tastine Swamp
608	Clancie Road	At Bugan Villa Drive
601	Stratton Major Road	Near Union Prospect Baptist Church
601	Stratton Major Road	Near Union Road
644	Jonestown Road	At Meadow Swamp
605	Plain View Lane	At Guthrie Creek
601	Cheery Row Lane	At Guthrie Creek and swamp
666	Tuckers Road	Entire road including Tuckers R.P.
667	Wrights Dock Road	Entire road
640	Lyneville Road	At 36" cross-pipes
625	Bryds Mill	At cross-pipes
615	Union Hope Road	At Exol Swamp
604	Bryds Bridge Road	At Bryds Bridge
612	Lilly Pond Rod	At Dragons Swamp Bridge
610	Dragonville Rod	At Timber Brook Swamp
614	Rock Springs Road	At bridge
14	Buena Vista Road	at K&Q/ Gloucester County line

Public Boat Ramps

There are 2 public boats ramps in the county along the Mattaponi River that are operated/maintained by the Virginia Department of Game and Inland Fisheries (VDGIF):

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Mattaponi River	Melrose	Yes	Concrete Ramp	1	37° 38' 14" N 37.6372145	76° 51' 18"W -76.8549627
Directions: From King & Queen Courthouse, Rt. 14 South (2.8 miles); Right onto Rt 602 (1.2 miles) to Ramp						
Mattaponi River	Waterfence	Yes	Concrete Ramp	1	37° 35' 31" N 37.5920552	76° 47' 55"W -76.7987125
Directions: From West Point, Rt 33 East, turn Left onto SR 14 (5 miles), turn Left onto SC 611 to end						
Virginia Department of Game an Inland Fisheries, 2015						

In addition to the VDGIF sites, there is a water access site to the Mattaponi River in Walkerton and in Shacklefords.

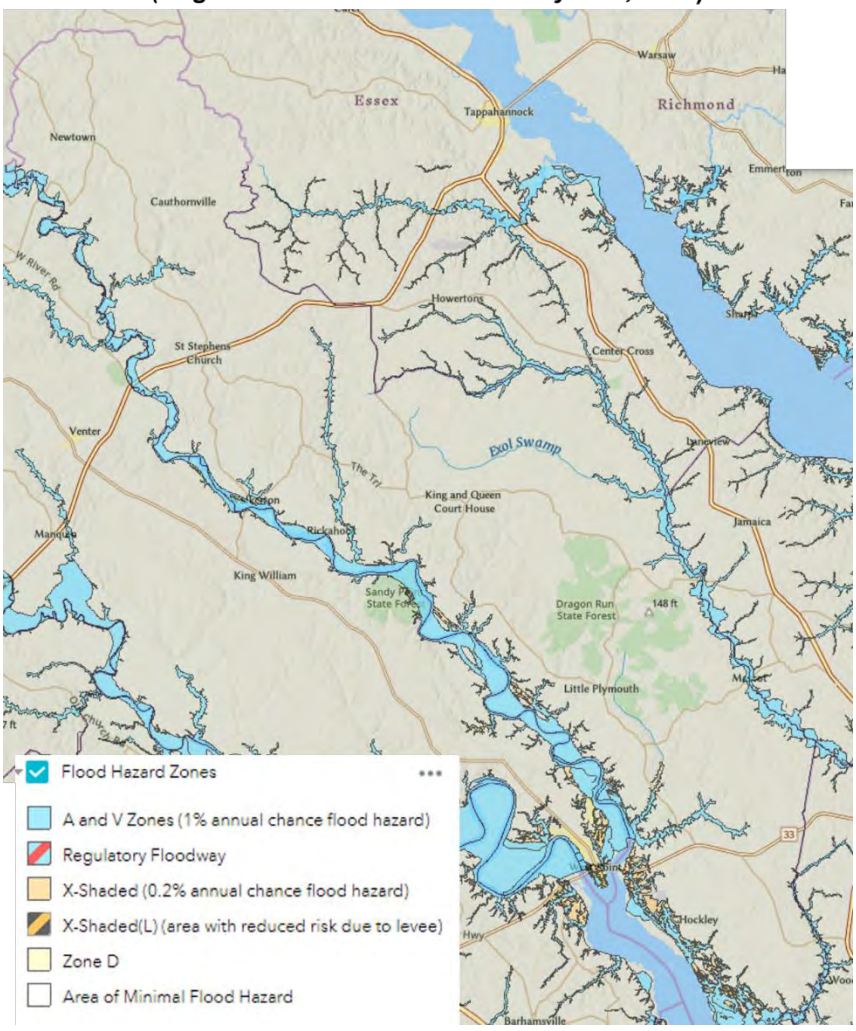
Due to the low velocity of the flood waters along this section of the Mattaponi River, none of these boat landings sustain damage from flood waters.

Floodplain

Below is a map of the floodplain within King and Queen County.

Flood Hazard Zones in King & Queen County

(Virginia Flood Risk Information System, 2021)

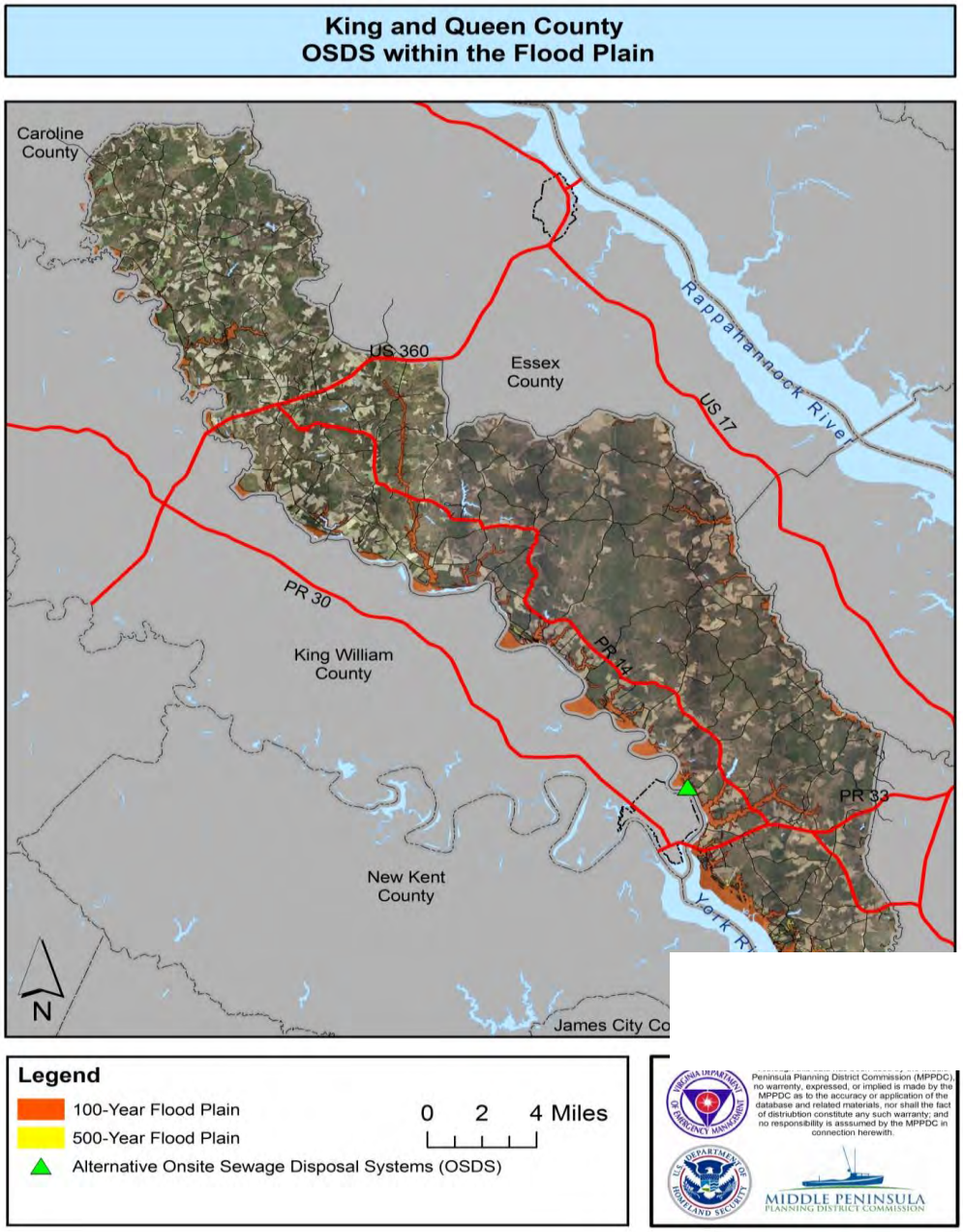


Alternative On-site Sewage Disposal Systems (OSDS)

The Virginia Department of Health (VDH) regulations have changed dramatically in recent years to keep pace with improvements in technology. Now, there are a number of "alternative on-site sewage disposal systems" that are allowed to be constructed where poor soils and/or a high-water table prevented the construction of a conventional septic system on the property. As of 2009, there were 1,208 OSDSs permitted and installed in the Middle Peninsula. There are an additional 2,006 OSDSs permitted by VDH but not yet installed (Figure 35).

Many of these are located in the 100-year floodplain, some of which could suffer damage during flooding events since most of the systems have essential mechanical and other components at-grade or slightly above grade.

Figure 35:



4.5.2. Essex County Critical Facilities and Public Utilities

The County's Offices are located within the Town of Tappahannock, which is centrally located mid-county along the Route 17 corridor. The County Offices are in a handful of buildings in downtown Tappahannock in an area that is outside of the 500-year floodplain. There are emergency generators at the County Administration Building and at the Sheriff's Office/Dispatch Center.

Additional properties that the County owns include 2 solid waste facilities located at Center Cross and Bray's Fork, the county library, the elementary school/school board offices, and the middle school/high school complex. All properties are located outside of the 500-year floodplain. The new middle school has an emergency generator.

The county/town is served by one volunteer fire department that has 3 fire stations. One station is located in Tappahannock along Airport Road, another is located at the northern end of the county along Route 17 at Loretto and the third station is located at the southern end of the County near Center Cross. The Tappahannock Volunteer Rescue Squad is in downtown Tappahannock, and it serves town residents as well as all county residents. All emergency response facilities are located outside of the 500-year floodplain. The fire department on Airport Road and the EMS facility downtown have emergency generators.

The Tappahannock-Essex County Community Airport is located off Route 360 at Paul's Crossroads. The airport is located on a high ridgeline, which is outside of the 500-year floodplain.

The new animal shelter that serves the town and county is located at the town's former maintenance facility along Airport Road, which does not flood.

Repetitive and Severe Repetitive Loss Residential Structures in Essex County

According to FEMA's records, Essex County has 32 Single-Family Repetitive Loss properties and 2 Single-Family Severe Repetitive Losses as of September 2021.

According to VDOT officials, flood prone roads in the Essex County/Tappahannock area include the following:

Table 30: Essex/Tappahannock Flood Prone Roads

Route	Road Name	Location
17	Church Lane	Tickners Creek at June Parker Marina
617	Island Farm Road	Piscataway Creek
646	Fort Lowery Lane	Rappahannock River
680	River Place	Rappahannock River

Route 17 is the main south/north road serving the county. This primary road has been designated as a hurricane evacuation route by the Commonwealth of Virginia for some Tidewater residents evacuating northward during a Category 2 or stronger hurricane. The road was elevated to reduce the risk and frequency of flooding on this stretch of road.

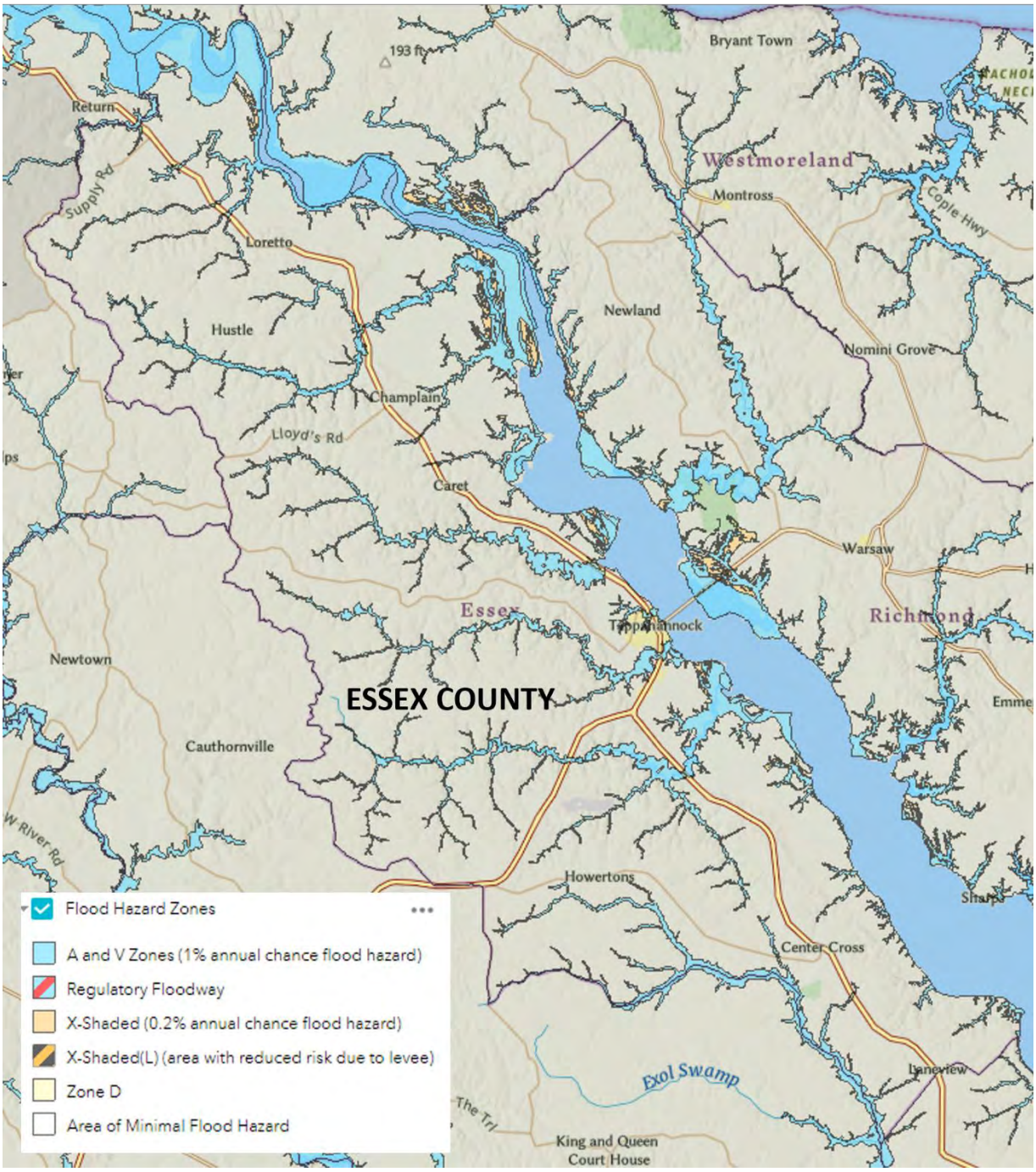
Also, according to town officials, all roads that dead end at the Rappahannock River flood but sustain little damage since flood velocities are low along this section of the river through Tappahannock.

Floodplain

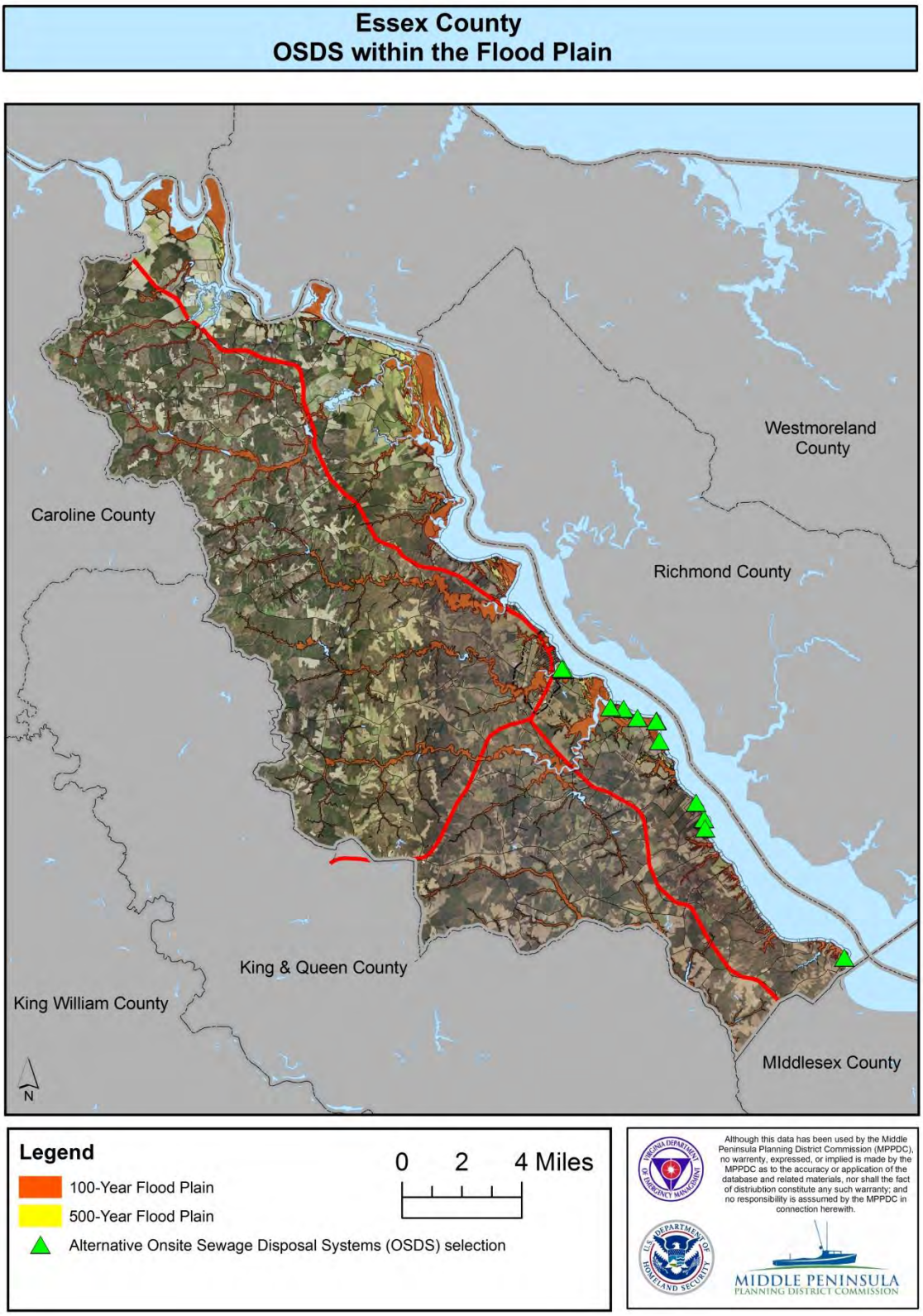
Below is a map of the floodplain within Essex County.

Flood Hazard Zones in Essex County

(Virginia Flood Risk Information System, 2021)



Alternative On-site Sewage Disposal Systems (OSDS). The following map (Figure 53) show the location of the OSDS systems constructed in the 100-year and 500-year floodplain in Essex County:



Tappahannock Critical Facilities and Public Utilities

The Town of Tappahannock provides public water and sewer services to its citizens. The water system does not sustain damage during floods.

The wastewater treatment plant is located along Hoskins Creek on the west side of Route 17. The wastewater treatment plant does not suffer damage during severe flooding events. In the last plan there was mention that there was one sewerage pump station located along Newbill Drive that received flood damage during hurricane strength storms. During Hurricane Isabel in 2003, the electrical controls needed to be repaired since there was flood damage. However, since the last plan the Newbill Drive electrical controls have been raised to above the flood line of Hurricane Isabel in hopes to avoid future issues.

Public Boat Landings

There is one public boat ramp in the Town of Tappahannock along Hoskin's Creek that is operated/maintained by the VDGIF:

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Hoskin's Creek	Hoskin's Creek	No	Concrete Ramp	1	35° 55' 12" N 37.9200873	76° 51' 26"W -76.8571004
Directions: Town of Tappahannock, Rt. T-1002 (Dock Street)						
Virginia Department of Game an Inland Fisheries, 2015						

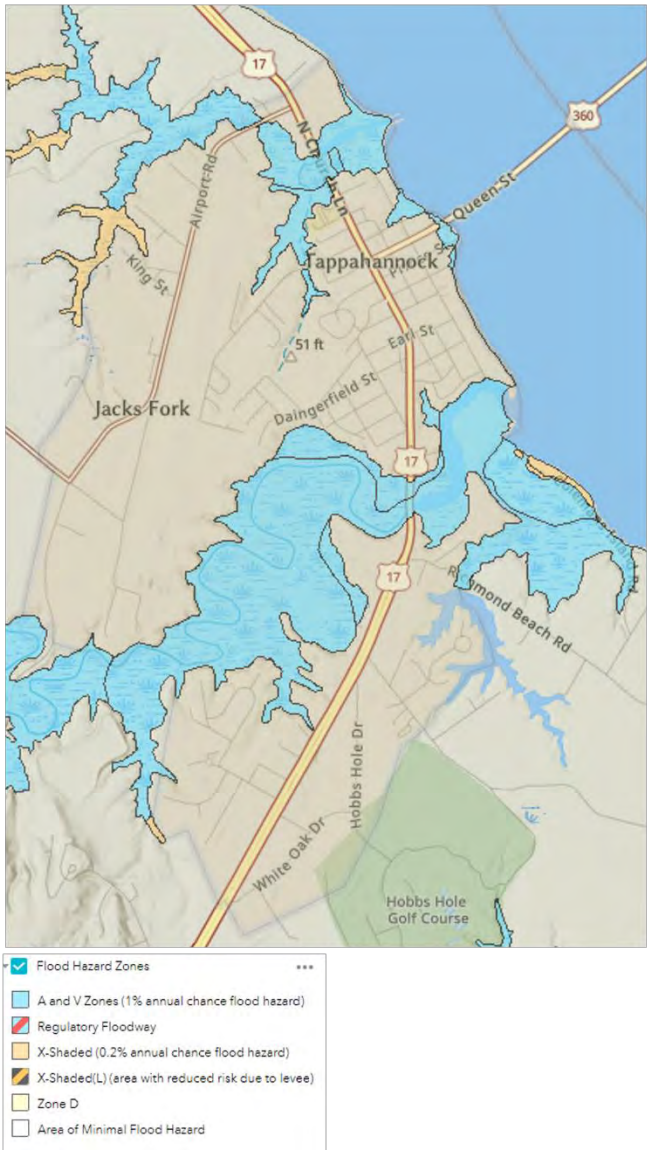
In addition to Hoskin's Creek, there is public access at the Prince Street Road ending which is owned by the Middle Peninsula Chesapeake Bay Public Access Authority. While Prince Street may suffer minor damage during severe storm events, Dock Street does not sustain damage from flood waters according to town officials.

Repetitive and Severe Repetitive Loss Residential Structures in the Town of Tappahannock

According to FEMA's records, the Town of Tappahannock has 2 Single Family Repetitive Loss properties and no Severe Repetitive Losses as of September 2021. The following map shows the floodplains in the Town of Tappahannock.

Flood Hazard Zones in the Town of Tappahannock

(Virginia Flood Risk Information System, 2021)



4.5.3. King William County Critical Facilities and Public Utilities

Public water and sewerage systems serve portions of the Route 360 growth corridor in Central Garage. A package wastewater treatment plant discharges sewer effluent into an unnamed tributary that leads into Moncuin Creek, which then flows into the Pamunkey River. Floodwaters do not adversely impact the wastewater treatment plant.

The public water system serves the relatively high and dry Central Garage area. Therefore, this Route 360/30 area water system does not sustain damage from flooding events.

According to VDOT officials, flood prone roads in the King William County and Town of West Point include the following:

Table 31: King William County and Town of West Point Flood Prone Roads		
Route	**Road Name**	**Location**
30	King William Road	Cypress Swamp at Olson's Pond
636	VFW Road	Cypress Swamp
632	Mt. Olive- Cohoke Road	Intersection of Route 633
609	Smokey Road	Herring Creek
628	Dorrel Road	Herring Creek
1006	Thompson Ave	West Point Creek
1003	Chelsea Road	West Point Creek to dead end
1130	Glass Island Road	Mattaponi River
1107	Kirby Street	1st to 7th Streets
n/a	1st to 7th Streets	Between Kirby St. and Pamunkey River
n/a	2nd to 5th Streets	Between Lee St. and Mattaponi River

Public Boat Landings

There are 2 public boat ramps in King William County that is owned and maintained by VDGIF:

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Mattaponi River	Aylett	Yes	Concrete Ramp	1	37° 47' 8" N 37.7855806	77° 6' 11"W -77.1030150
Directions: Aylett, Rt 360 East, Right onto Rt 600						
Pamunkey River	Lestor Manor	Yes	Concrete Ramp	1	37° 35' 10" N 37.5861120	76° 59' 4"W -76.9845725
Directions: From King William Courthouse, Rt 30 South (.7 miles); Right on Rt 633 (7.4 miles); Left on Rt 672 (.4 miles)						
Virginia Department of Game an Inland Fisheries, 2015						

Additionally, there is a very small canoe/kayak launce at Zoar State Forest located a few miles north of Route 360.

Due to the low velocity of the flood waters along these upper reaches of the Mattaponi River, neither of these boat landings sustain damage from flood waters.

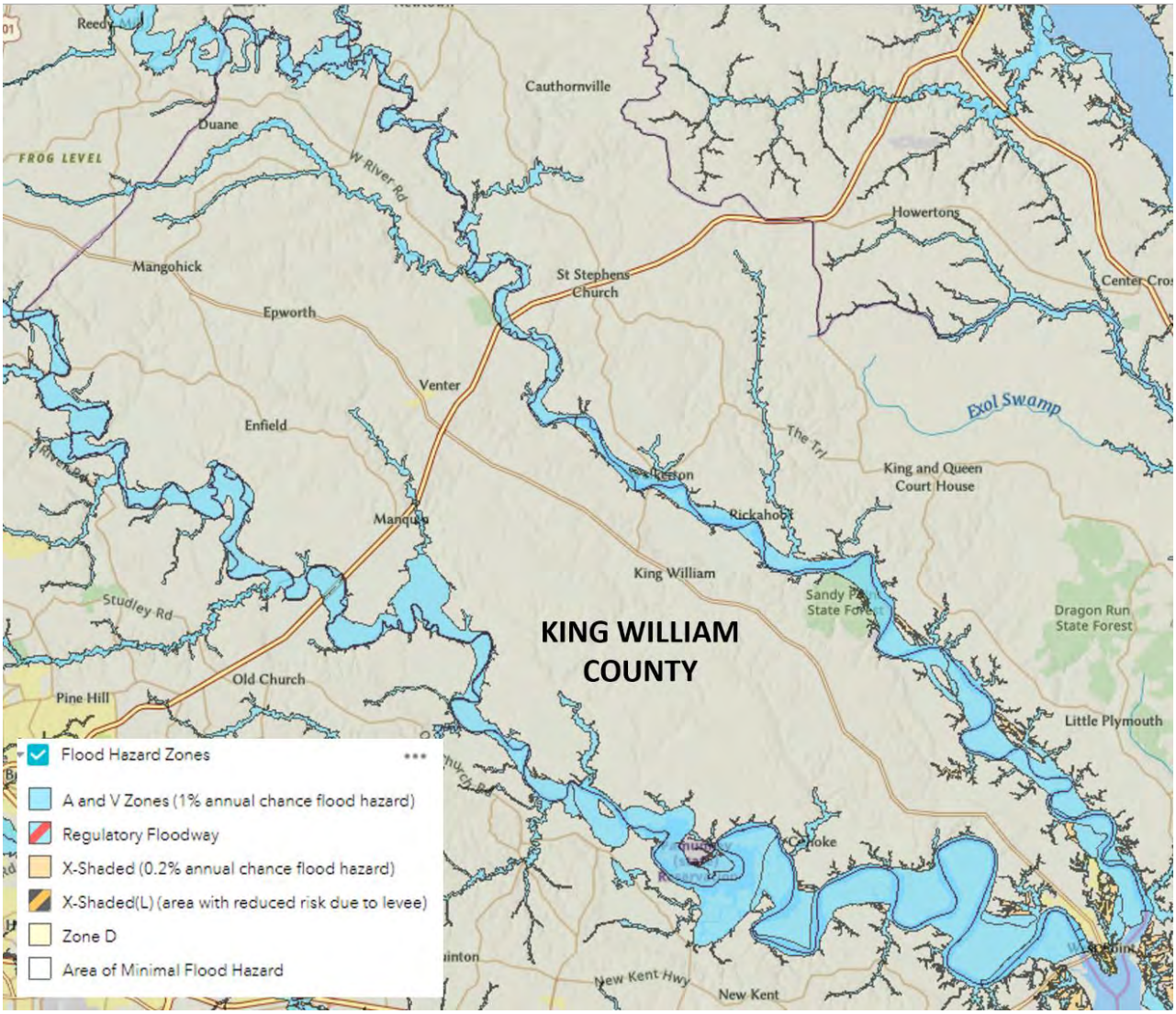
Repetitive and Severe Repetitive Loss Residential Structures in King William County

According to FEMA's records, King William County has no Repetitive Loss residential properties or Severe Repetitive Loss as of October 2021.

Floodplain

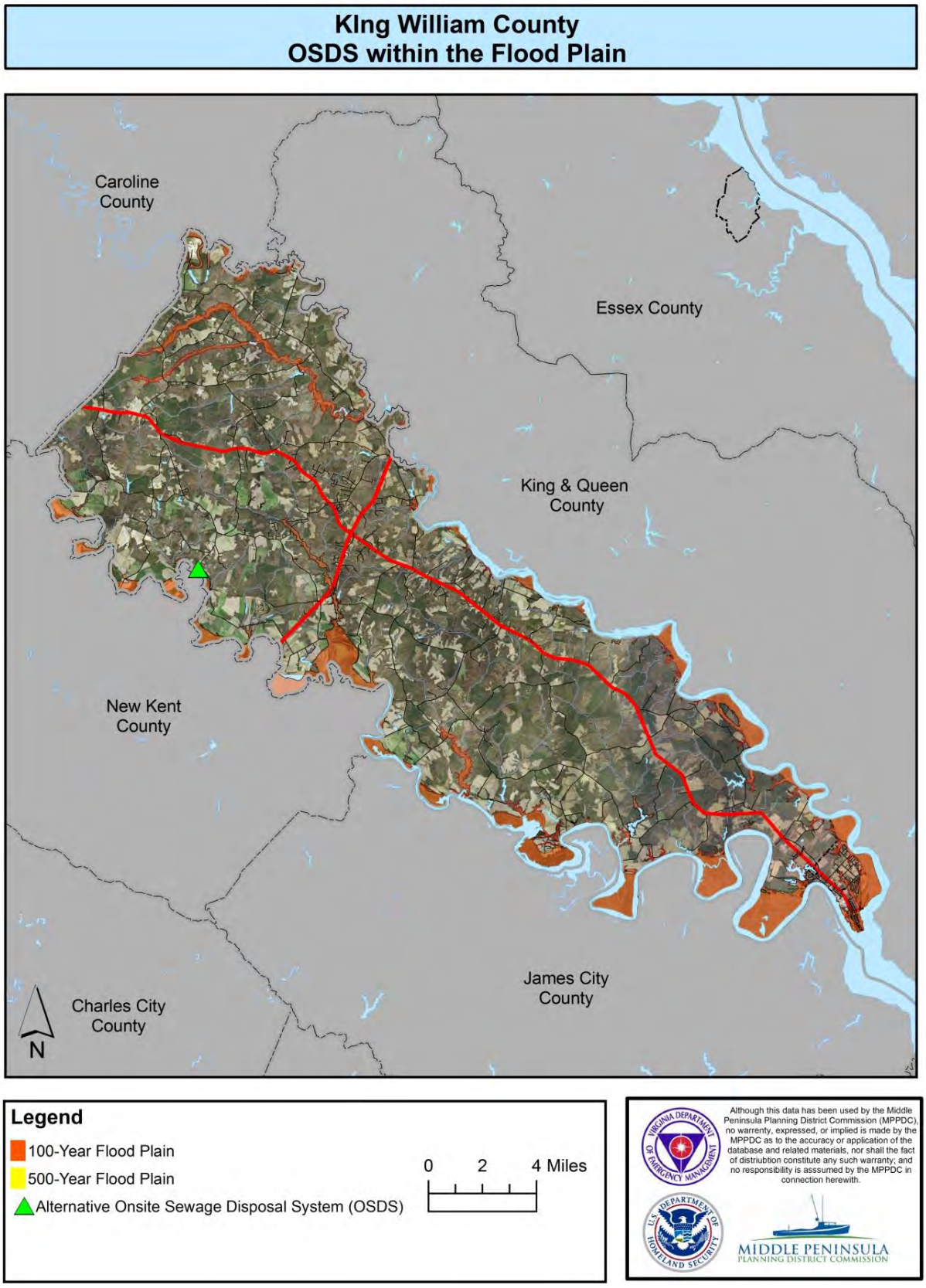
The following map shows the floodplains in King William County.

Flood Hazard Zones in King William County
(Virginia Flood Risk Information System, 2021)



Alternative On-site Sewage Disposal Systems (OSDS)

The map (Figure 64) below shows the locations of the installed OSDS facilities constructed in the 100-year floodplain in King William County.


King William County
OSDS within the Flood Plain
Caroline County
Essex County
King & Queen County
New Kent County
James City County
Charles City County
N
Legend
100-Year Flood Plain
500-Year Flood Plain
Alternative Onsite Sewage Disposal System (OSDS)
0 2 4 Miles
Although this data has been used by the Middle Peninsula Planning District Commission (MPPDC), no warrenty, expressed, or implied is made by the MPPDC as to the accuracy or application of the database and related materials, nor shall the fact of distriubtion constitute any such warranty; and no responsibility is asssumed by the MPPDC in connection herewith.
MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

Town of West Point Critical Facilities and Public Utilities
Located at the confluence of the Mattaponi and Pamunkey Rivers where they become the headwaters of the York River, there is public infrastructure, private residences and downtown businesses that are at risk of flooding during severe storms.

The town provides both public water and sewer service to its residents. The water system is owned and operated by the town and sustains little damage during flooding events.

The ownership and operation of the town's sewerage system has been turned over to the Hampton Roads Sanitation District (HRSD). The wastewater treatment plant is located at the east end of 23rd Street. The facility did not flood during Hurricane Isabel in 2003 and the vital electrical and mechanical controls are on a slightly elevated portion of the site and therefore, the facility's location does not pose a risk of flooding.

A sewer pump station located on 2nd Street near the point does have a flooding problem. During Hurricane Isabel, the pump motors in the well house flooded and needed to be dried out. However, the electrical controls are mounted high enough in the pump house so that they did not sustain flood damage. There is a sewer pump station located on 13th street that did not flood during Hurricane Isabel, but the floodwaters did reach within 1-foot of the facility.

Public Boat Landings
There is one public boat landing located along the Mattaponi River on the north side of the Lord Delaware Bridge on Glass Island Road. This facility does receive minor damage to the roadway and parking areas during severe storms.

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Mattaponi River	West Point	Yes	Concrete Ramp	2	37° 47' 8" N 37.5406099	76° 47' 23"W -76.7896487
Directions: Town of West Point on Rt 33						
						VDGIF, 2015

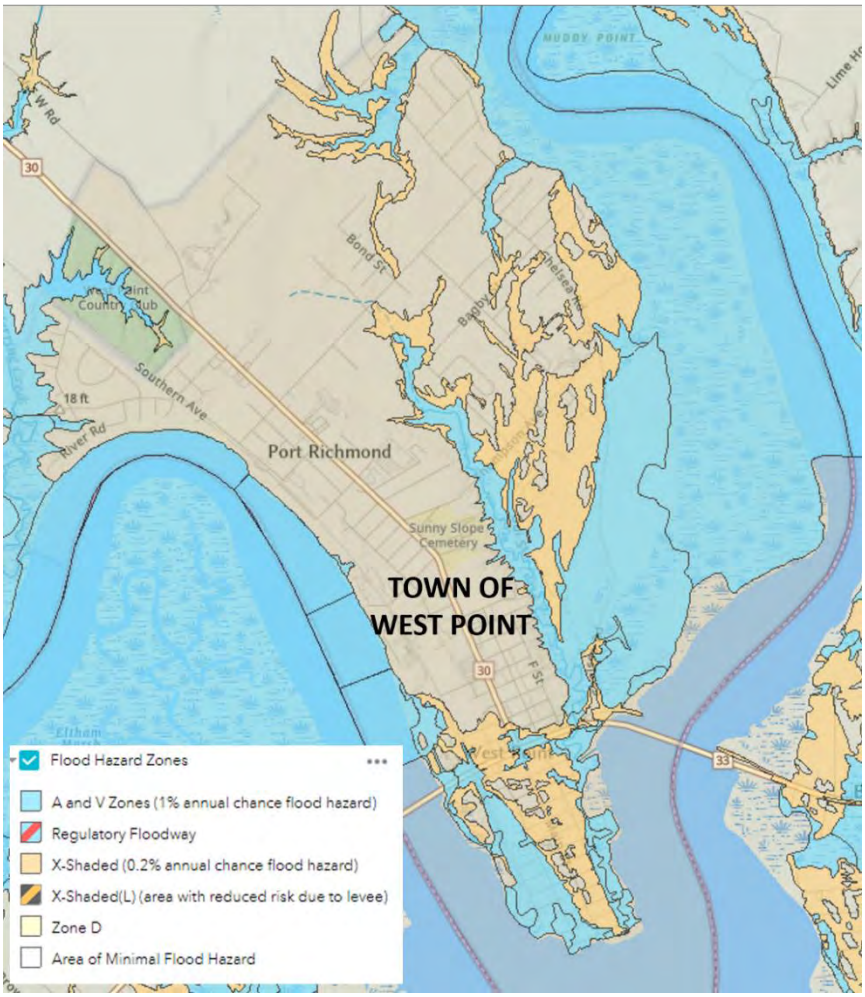
Public Park Facility
On the south side of the Lord Delaware Bridge, there is a small-town park with walking trails and benches adjacent to the water's edge. This is a new facility that was built in conjunction with the new bridge construction that was completed in 2006. Due to the minimal amount of infrastructure at this shoreline facility, it is an anticipated that there will be no more than minor damages from rising waters in this wetlands area adjacent to the Mattaponi River.

Repetitive and Severe Repetitive Loss Residential Structures in West Point
According to FEMA's records, the Town of West Point has 8 Single Family and 1 Non-Residential Repetitive Loss properties and zero Severe Repetitive Losses as of October 2021.

The floodplains are displayed in the following map.

Flood Hazard Zones in the Town of West Point

(Virginia Flood Risk Information System, 2021)



Numerous homes and downtown businesses at the southern end of West Point flood during severe storms particularly as flood waters reached 8 feet 6 inches above mean low water which is 6 inches above the 8 ft 100-year flood plain elevation. The West Point School Complex, which serves as the town's shelter, is located on the northern side of the town and the buildings are not subjected to floodwaters. However, Chelsea Road is located along the Mattaponi River, and it is 1 of 2 routes that are used to access the school complex. This roadway does flood during severe storms.

4.5.4. Gloucester Critical Facilities and Public Utilities

The county has a relatively extensive network of public water and sewer facilities in and around the Gloucester Courthouse area. The Beaverdam Reservoir, located just north of the courthouse area, serves as the drinking water source for the county's public water supply system. As discussed earlier in the Dam Impoundment Section of the plan, the dam is structurally well-built and remains fully certified by the DCR (Figure 3). Below the dam there are approximately 200 homes that would flood if the Reservoir structure failed. However, in 1999 the impoundment overflowed during Hurricane Floyd yet no flood damage to the home since the excess water flowed downstream using the emergency spillway.

Table 32 provides a list of dams within the locality that may be impacted by natural hazards as well.

Table 32: The following is a list of dams in Gloucester County that are on the Virginia Department of Conservation and Recreation's Certification List.

Dam Name	Class	Height	Capacity in Acre Feet	Water Body
Woodberry Farm	3	8	158	Jones Creek
Weaver Dam	3	6	81	Jones Creek
Haynes	3	15	366	Carter Creek
Robins Creek	3	16	219	Wilson
Cow Creek	2	16	931	Cow
Burke Stream	3	20	481	Burke Mill
Cypress Shores River	3	15	143	Piankatank
Haines Pond	3	9	50	Carter Creek
Beaverdam Reservoir	1	39	20,523	Beaverdam Creek
Wood Duck Pond	4	Unknown	Unknown	Unknown
Leigh Lake	4	12	unknown	Jones Creek

The water distribution system does not suffer damage during severe storm events since it is a closed underground system. The sewerage collection lines and pumps stations are owned and operated by Gloucester County. There are 2 pump stations in the Gloucester Courthouse area (Pump # 11 and Pump #13) that sustained damage during Hurricane Floyd in 1999. The damage was caused by floodwaters resulting from the overtopping of the Beaverdam Reservoir as previously mentioned. After the wastewater is collected, it is transported in a large force main that runs down Route 17, crosses under the York River and then flows into the York River Wastewater Treatment Plant in York County. The large force main and treatment plant are owned and operated by the Hampton Roads Sanitation District. The force main is a closed underground system that does not sustain damage during severe flooding events.

The Achilles Elementary School site, located in the southeastern section of the county, is adversely affected by flood waters from storms surges associated with a Category 1 hurricane.

According to VDOT officials, flood prone roads in Gloucester County include the following:

Table 33: Gloucester County Flood Prone Roads.

Route	Road Name	Location of Floodwaters
684	Starvation Road	From Big Oak Lane to ESM
662	Allmondsville Road	From Rte. 606 to Rte. 618
618	Chappahosic Road	From Rte. 662 to Rte. 639
636	Brays Point Road	From Eagle Lane to ESM
1303	Carmines Islands Road	From Gardner Lane to ESM
646	Jenkins Neck Road	Various spots from Owens Road to ESM
648	Maundys Creek Road	From Rte. 649 to ESM
649	Maryus Road	From Haywood Seafood Lane to ESM
652	Rowes Point Road	From 653 to ESM
649	Severn Wharf Road	Various spots from 653 to ESM

Public Boat Ramps

There are **4** public boat landings in Gloucester County that are owned and operated by the VDGIF:

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Piankatank River	Deep Point	Yes	Concrete Ramp	1	37° 32' 10" N 37.5361228	76° 29' 43"W -76.4953889
Directions: From Glenns, Rt 198 East (7.5 miles); Left on Rt 606 (1.5 miles)						
Porpoptank River	Tanyard	No	Concrete Ramp	1	37° 27' 17" N 37.4548078	76° 40' 5"W -76.6679753
Directions: From Gloucester, Rt 14 North (4.3 miles); Left on Rt 613 (3.3 miles); Right on Rt 610 (.6 miles); left on Rt 617 (.5 miles)						
Ware River	Warehouse	Yes	Concrete Ramp	1	37° 24' 11" N 37.4031611	76° 29' 23"W -76.4896286
Directions: East of Gloucester on Rt 621						
York River	Gloucester Point	Yes	Concrete Ramp	2	37° 14' 45" N 37.2457058	76° 30' 17"W -76.5048003
Directions: Town of Gloucester Point, Rt 1208 – TEMPORARILY CLOSED						
VDGIF, 2015						

In addition to VDGIF there is a list of other public boat ramps throughout the County, including:

- ***Cappahosic Landing Location***: End of Cappahosic Road. York River Access. Bank fishing, beach, Picnicking, limited parking, and restrooms - May thru October. Park area maintained by Gloucester County while the Landing is maintained by VDOT.
- ***Cedar Bush, Oliver's Landing Location***: End of Cedar Bush Road. York River Access. Gravel ramp and finger pier. Maintained by Gloucester County and VDOT.
- ***Field's Landing***: End of Field's Landing Road. York River Access. Car top boats only, no trailer access. Maintained by VDOT.
- ***Glass Point Landing***: End of Glass Road. Severn River Access. Car top boats only, no trailer access Maintained by Gloucester County and VDOT.
- ***Gloucester Point Beach Park Location***: End of Greate Road, next to Coleman Bridge. York River Access. Sandy beach, swimming, picnicking, outdoor showers – seasonal, restrooms, playground, fishing pier, parking and two landings. One landing is maintained by Gloucester County and one by DGIF (see above for details).
- ***John's Point Landing*** - End of John's Point Road. Small boats only, gravel ramp and sand ramp for car top boats: Fishing Parking Maintained by Gloucester County and VDOT
- ***Miller's Landing*** - car top boats only, no trailer access Location: End of Miller's Landing Road Poropotank River Access Fishing Parking Maintained by VDOT
- ***Payne's Landing***: End of Paynes Landing Road. Ware River Access. Car top boats only, no trailer access. Maintained by Gloucester County.

Repetitive and Severe Repetitive Loss Residential Structures in Gloucester County

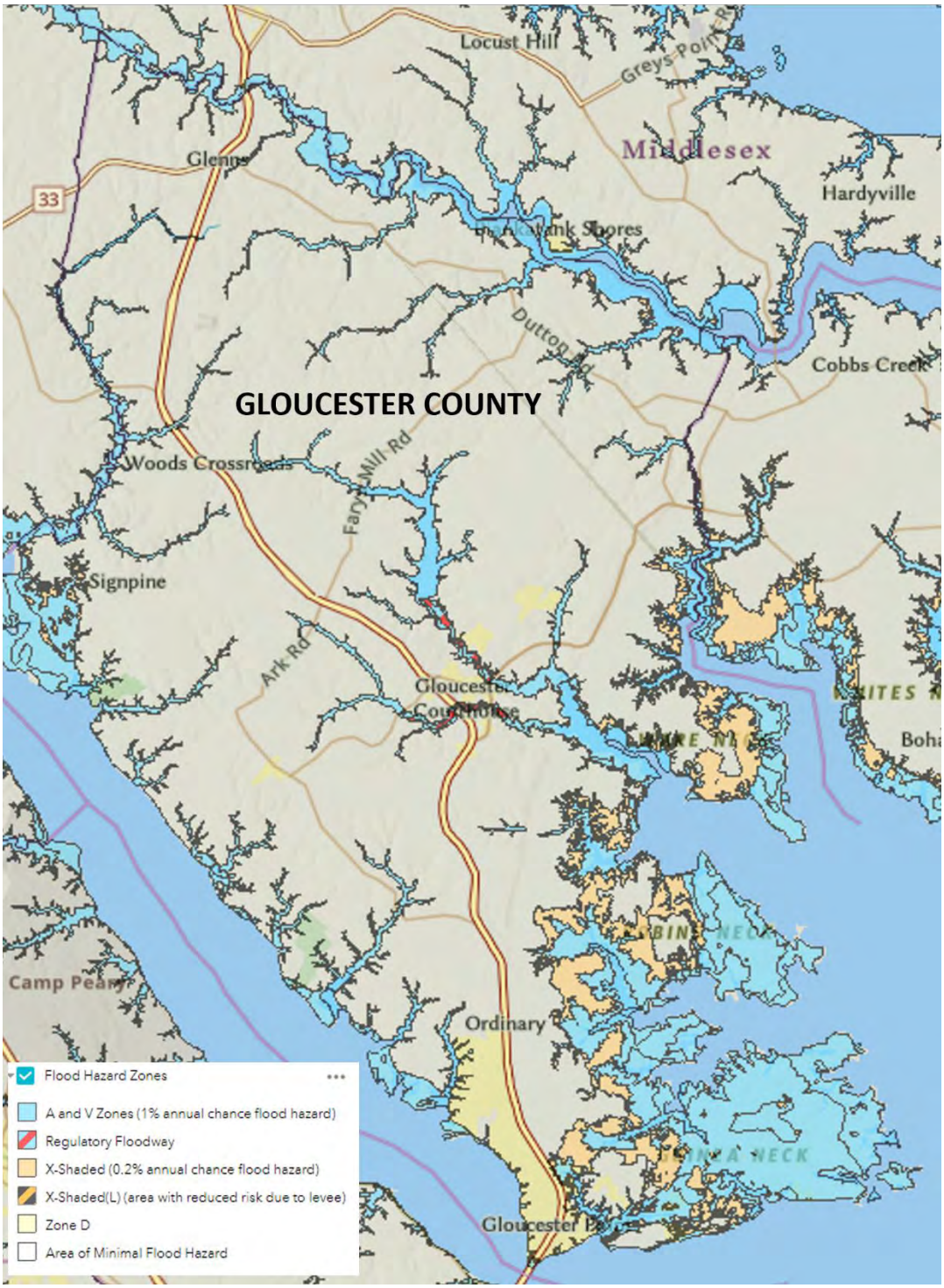
According to FEMA's records, Gloucester County has 146 (ie.141 Single Family, 1 Non-Residential, 3 Condos, and one 2-4 Family properties) Repetitive Loss properties and 13 (i.e. 11 Single Family and 2 non-residential properties) Severe Repetitive Losses as of October 2021.

Floodplain

The following map shows the floodplains in Gloucester County.

Flood Hazard Zones in Gloucester County

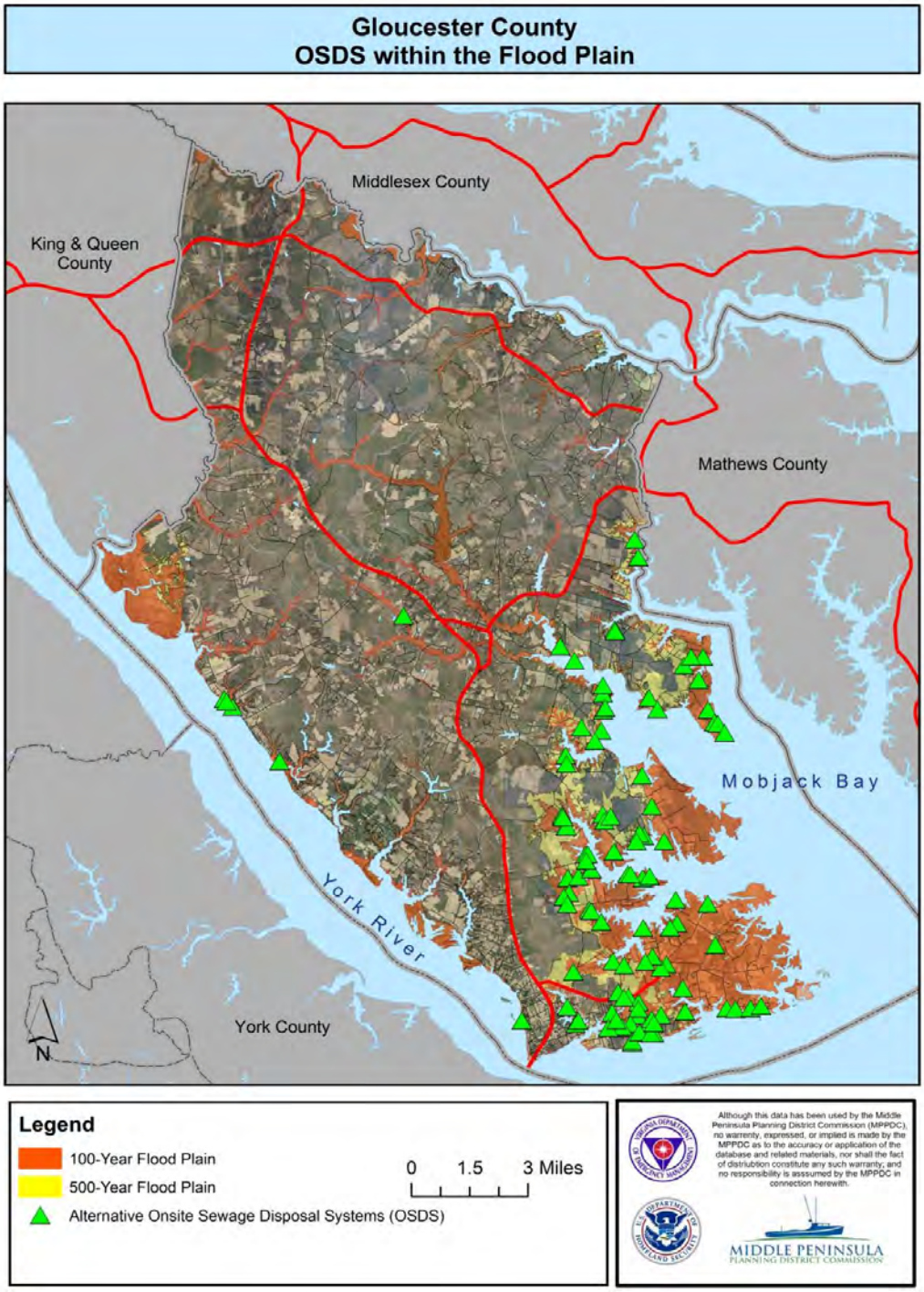
(Virginia Flood Risk Information System, 2021)



Alternative On-site Sewage Disposal Systems (OSDS)

The following maps (Figure 36) show the locations of the installed OSDS facilities constructed in the 100-year and 500-year floodplain in Gloucester County.

Figure 36:



4.5.5. Mathews Critical Facilities and Public Utilities

New Point Comfort Lighthouse, located at the southern tip of Mathews County, has undergone significant flood damage resulting from the lighthouse being separated from the mainland due to severe erosion. Mathews County owns the lighthouse facility. In 2016 the Waterfront Development Corporation installed a new pier at the lighthouse that allowed contractors to access the site for restoring the stone tower. Restoration of the tower started in 2020 and concluded on October 12, 2021, when a ceremony was held to relight the lighthouse.

According to VDOT officials, flood prone roads in Mathews County include the following:

Table 34: Mathews County Flood Prone Roads

Route	Road Name	Location
610	Marsh Hawk Road	From Rte. 614 to Rte. 611
600	Circle Drive	From Rte.14 to Rte. 14
600	Light House or Point Road	From Rte. 14 to ESM
611	Tabernacle Road	From Rte. 613 to Rte. 609
611	Tabernacle Road	From Rte. 610 to Rte. 609
609	Bethel Beach Road	From Rte. 610 to ESM
609	Bethel Beach Road	From Rte. 614 to Rte. 611
643	Haven Beach Road	From Rte. 704 to ESM
633	Old Ferry Road	From Rte. 704 to 636
608	Potato Neck Road	From Rte. 649 to ESM
644	Bandy Ridge Road	From Rte. 611 to Rte. 614

Public Boat Ramps

There is one public boat landing in Mathews County that is owned and operated by the VDGIF:

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
East River	Town Point	Yes	Concrete Ramp	1	37° 24' 55" N 37.4143723	76° 20' 15"W -76.3375842
Directions: From Mathews, Rt 14 South (3.8 miles); Right onto Rt 615 (.6 miles)						
VDGIF, 2015						

Repetitive and Severe Repetitive Loss Residential Structures in Mathews County

According to FEMA's records, Mathews County has 169 (i.e. 164 Single family, 3 Non-resident, 1 Other resident, and 1 Condo) Repetitive Loss residential properties and 11Single Family Severe Repetitive Losses as of October 2021.

Public School Properties

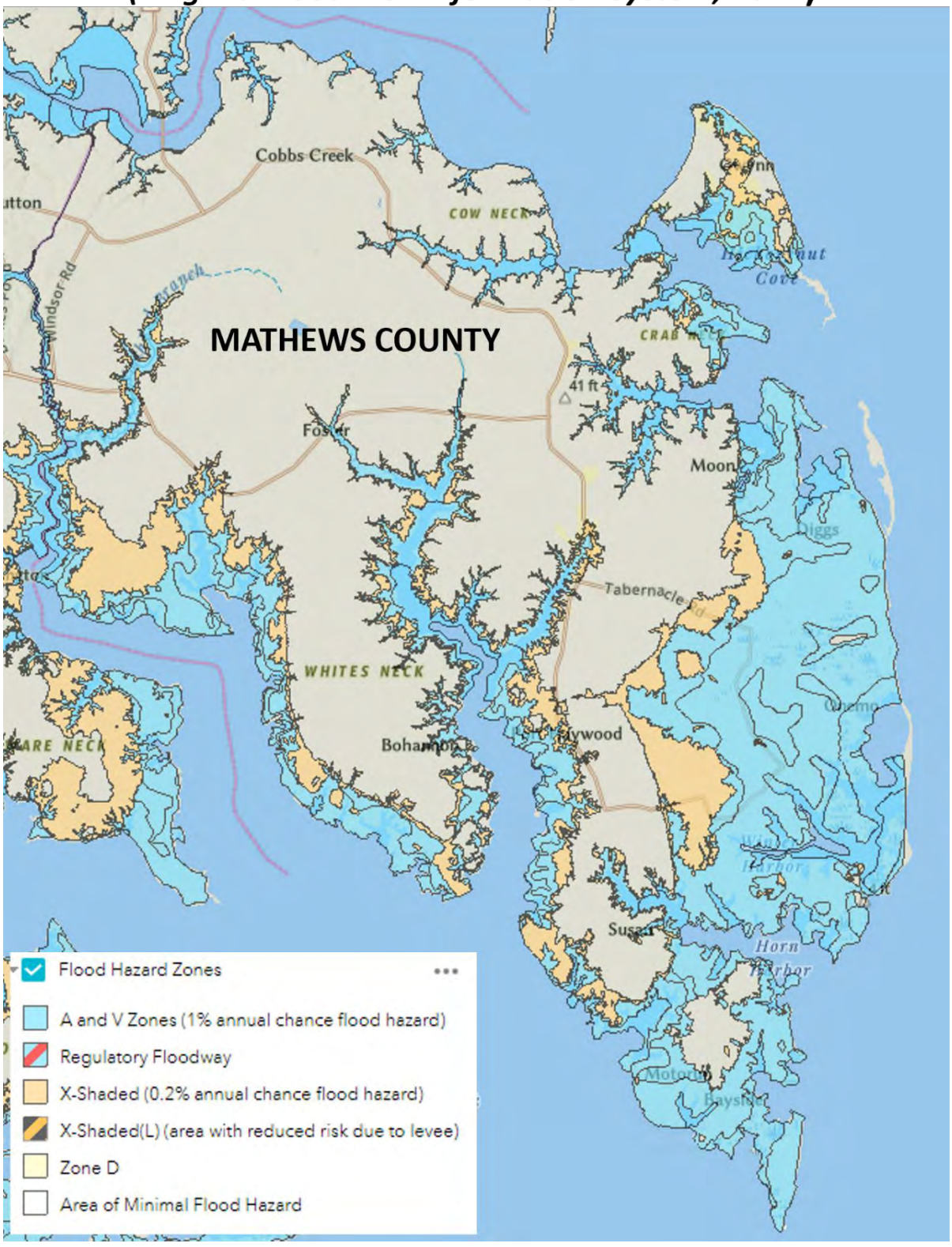
During a Category 2 hurricane, the Thomas Hunter Middle School and the Lee Jackson Elementary School properties become flooded.

Floodplain

The following map shows the floodplains in Mathews County.

Flood Hazard Zones in Mathews County

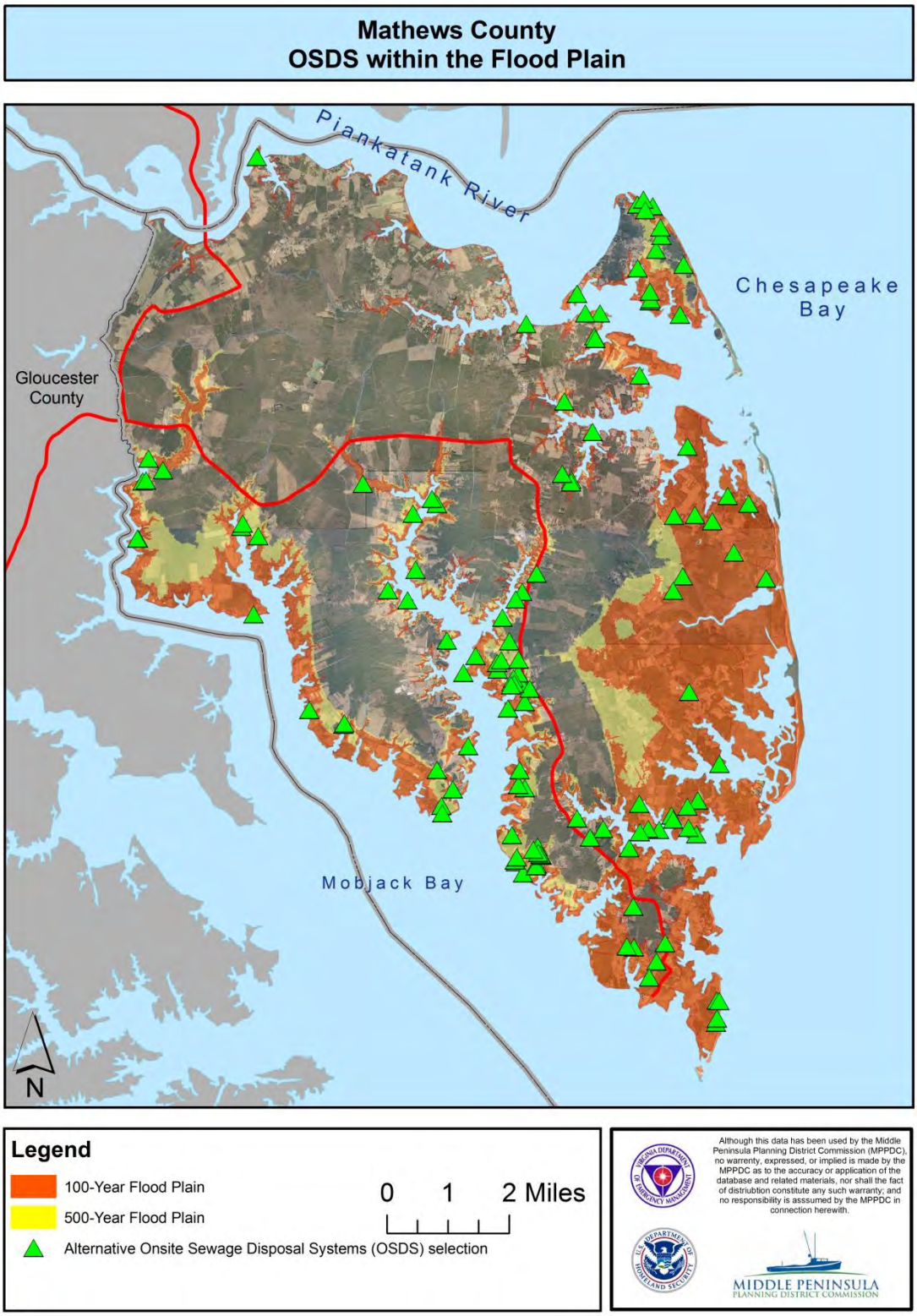
(Virginia Flood Risk Information System, 2021)



Alternative On-site Sewage Disposal Systems (OSDS)

The following map (Figure 37) show the location of the OSDS facilities constructed in the 100-year and 500-year floodplains in Mathews County.

Figure 37:



4.5.6. Middlesex County Critical Facilities and Public Utilities

The county does not currently operate any public water systems. However, there are community water systems operated by private companies serving the Village of Saluda and some of the larger residential subdivisions in the lower portion of the county in the Hartfield and Deltaville areas. These water systems do not sustain flood damages from severe hurricanes and nor'easters.

The County does have a public sewerage system in the planning stages that will serve the Village of Saluda and properties east along the Route 33 corridor towards the Cook's Corner area. The wastewater treatment plant and outfall for this proposed system will be built along a tributary of Urbanna Creek, located between Saluda and Cook's Corner.

Since this project is in the permitting/design stage, it is assumed that the facility will be designed and constructed in a manner to avoid any future adverse impacts from floodwaters.

According to VDOT officials, flood prone roads in Middlesex County/Urbanna include the following:

Table 34: Middlesex County/Urbanna Flood Prone Roads

Route	Road Name	Location
648	Montague Island Road	From Rte.604 to ESM
651	Smokey Point	From Rte. 640 to Rte. 685
1103	Irma's Lane	From Rte. 33 to Rte. 1102
628	Mill Creek Road	From Rte. 702 to ESM
636	Timber Neck Road	From Rte. 643 to Rte. 659

Public Boat Ramps

There are 3 public boat landings in Middlesex County that are owned and operated by the VDGIF:

Water Body	Access Area	Barrier Free	Type	Ramps	Latitude	Longitude
Parrotts Creek	Mill Stone	Yes	Concrete Ramp	1	37° 43' 36" N 37.7266569	76° 37' 19"W -76.6219992
Directions: Church View, Rt 17 North (1.1 miles); Right on Rt 640 (4.4miles; Left on Rt 608 (0.8 miles)						
Rappahannock River	Mill Creek	Yes	Concrete Ramp	1	37° 35' 3" N 37.5842494	76° 25' 28"W -76.4244480
Directions: From Hartfield, Rt 3 North (0.5 miles); Right on Rt 626 (3.1 miles)						
Rappahannock River	Saluda	Yes	Concrete Ramp	1	37° 37' 21" N 37.6225893	76° 34' 54"W -76.5816117
Directions: Rt 618 North (1.4 miles) of Saluda						
VDGIF, 2015						

Repetitive and Severe Repetitive Loss Residential Structures in Middlesex County

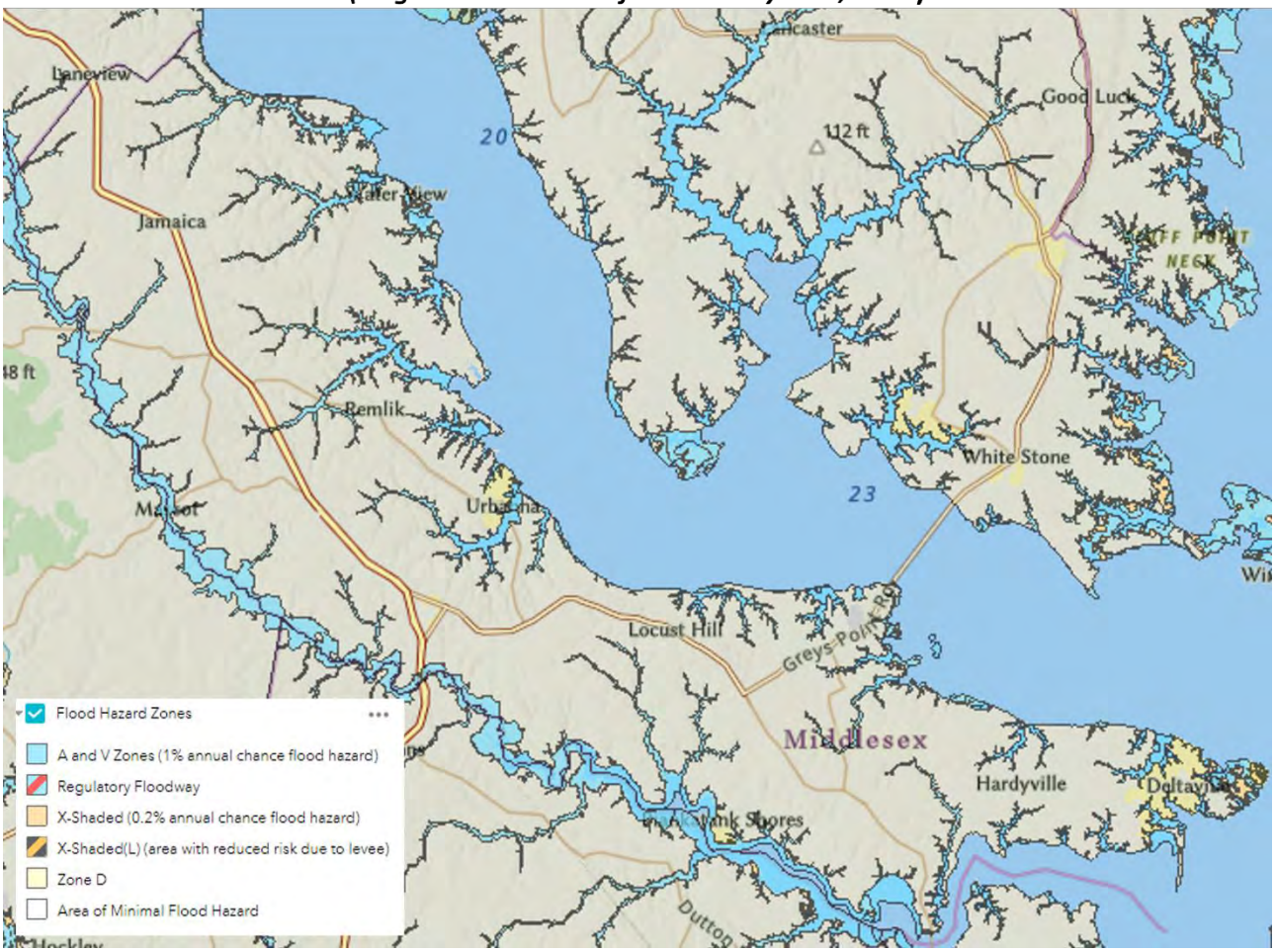
According to FEMA's records, Middlesex County has 35 Single Family Repetitive Loss properties and 2 Single Family Severe Repetitive Loss properties as of October 2021.

Floodplain

The following map shows the floodplains in Middlesex County.

Flood Hazard Zones in Middlesex County

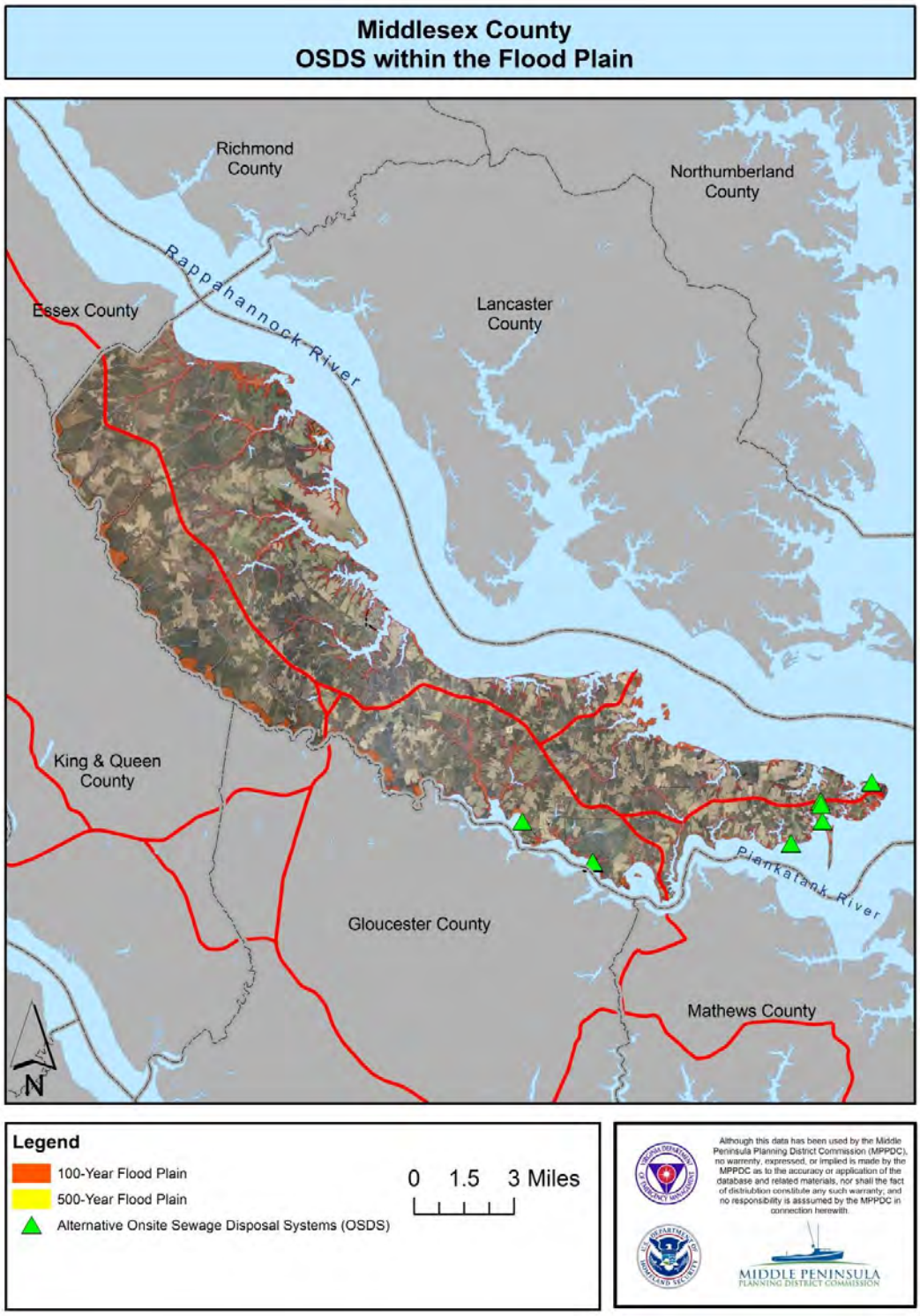
(Virginia Flood Risk Information System, 2021)



Alternate On-site Sewage Disposal Systems (OSDS)

The map (Figure 38) below shows the location of the OSDS facilities constructed in the 100-year and 500-yer floodplain in Middlesex County.

Figure 38:


Middlesex County
OSDS within the Flood Plain
Richmond County
Northumberland County
Rappahannock River
Essex County
Lancaster County
King & Queen County
Gloucester County
Piankatank River
Mathews County
N
Legend
100-Year Flood Plain
500-Year Flood Plain
Alternative Onsite Sewage Disposal Systems (OSDS)
0 1.5 3 Miles
Although this data has been used by the Middle Peninsula Planning District Commission (MPPDC), no warranty, expressed, or implied is made by the MPPDC as to the accuracy or application of the database and related materials, nor shall the fact of distribution constitute any such warranty; and no responsibility is assumed by the MPPDC in connection herewith.
MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

Urbanna Critical Facilities and Public Utilities
The Town of Urbanna provides public water and sewer service to its residents. The town operates the public water system which serves town residents as well as some nearby customers in surrounding Middlesex County.

The sewerage collection and treatment system is operated by the HRSD. When flood waters are anticipated, the staff at HRSD turn off the pumps at the sewerage pump stations to prevent pumping floodwaters into the wastewater treatment plant.

The wastewater treatment plant is located on high land next to the town's water tower, which is an area that does not flood.

The town operates the Urbanna Town Marina that includes a boat/fishing dock, a small beach area, a small park and a small operations building - all located at Upton's Point along the Rappahannock River. This facility suffered significant damage in 2003 from Hurricane Isabel and has been completely rebuilt since then at an approximate cost of $850,000.

Repetitive and Severe Repetitive Loss Residential Structures in the Town of Urbanna
According to FEMA's records, the Town of Urbanna has 2 (ie. 1 Single Family and 1 Other resident property) Repetitive Loss residential properties and zero Severe Repetitive Loss properties as of October 2021.

In 2003, Hurricane Isabel damaged/destroyed 5 houses along low-lying Island Drive. When these houses were re-built by the property owners, they were elevated in order to prevent future damage from flood waters along this section of the Rappahannock River. The following map shows the floodplains in the Town of Urbanna.

Flood Hazard Zones in the Town of Urbanna

(Virginia Flood Risk Information System, 2021)

4.5.7. Upper Mattaponi Critical Facilities

The Upper Mattaponi Indian Tribe established a medical facility in Aylett, Virginia in 2021. Aylett Family Wellness is the Commonwealth's first Indian Health Service Clinic, which operates under the PL 93-638 contract, and offers a trio of medical services to tribal citizens and residents of the rural community. The clinic is a primary care provider; however, the facility also offers on-site laboratory services and a fully functioning pharmacy. Aylett Family Wellness is located at 7864 Richmond Tappahannock Highway, Aylett, Virginia 23009.

The government offices of the Upper Mattaponi Indian Tribe are located at 13467 King William Road, King William, Virginia 23086.

Flooding, Hurricane, and Sea Level Rise

Hazus is a nationally recognized multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide methodology and software application to develop multi-hazard losses at a regional scale. The published online Hazus Technical Manuals provide detailed information about how the models work and how the models generate estimated loss estimates. The loss estimates are used primarily by local, state and regional officials to plan and stimulate efforts to reduce risk from multi-hazards and prepare for emergency response and recovery[1].

Potential loss estimates analyzed in Hazus includes:

- Physical damage to residential and commercial buildings, schools, essential facilities, and infrastructure
- Economic loss including lost jobs, business interruptions, repair, and reconstruction costs.

This analysis for flood, hurricane, and sea level rise impact implements two Hazus analysis modules, flood and wind. The Hazus flood module uses depth of flooding data along with industry standard depth damage curves to estimate the economic impact of various flood scenarios. Riverine flooding, coastal flooding, and sea level rise scenario depth of flooding estimates from the National Oceanic and Atmospheric Agency (NOAA) are analyzed in the Hazus flood module. Hurricane damages are calculated with wind speed, direction, and duration analysis from the Hazus hurricane module. Model information is from either historical hurricane tract and impacts or are estimated in a probabilistic scenario. Hurricane wind driven storm surge is not calculated in the Hurricane model, but instead is a component of the coastal analysis that takes both estimated storm surge and wave-run-up into account in the depth of flooding damages.

Results of the Hazus modules are captured at the Census block level for all Hazards. Census blocks align well with County and incorporated jurisdiction boundaries. The results for the three federally recognized Tribes within the Middle Peninsula, they are represented as a portion of the overall County results and Tribal Designated Statistical Areas (TDSA) have been included in maps. According to the US Census Bureau, TSDAs are *intended to encompass a compact and contiguous area that contains a concentration of individuals who identify with the delineating federally recognized American Indian tribe. TDSAs are also intended to be comparable to American Indian reservations within the same state or region and provide a means for reporting statistical data for the area.* Please note this TDSAs may not be the Tribe's planning area of the AHMP, land owned by the Tribe, land in trust to the Tribe, Tribal ancestral land, or land of importance to the Tribe. Additionally, upon correspondence with the Tribes the TDSAs did not sufficiently represent their Tribe. Finally, it was found that this the TDSA data did not include the Upper Mattaponi Tribe. Future Hazus runs will need to improve and capture the Tribes planning area and assess the losses within these areas.

For each scenario, Flood Hazards (Riverine and Coastal), Hurricane Wind Hazard, and Sea Level Rise Hazard, a description of the methodology and parameters for estimation of the hazard, a description of the built and potential loss environment, and the results of the scenario are presented in narrative, tabular, and mapping formats. All supporting digital input and results are included as an annex to this analysis.

[1] Hazus User & Technical Manuals, https://www.fema.gov/flood-maps/tools-resources/flood-map-products/hazus/user-technical-manuals\

Flood Hazard Analysis

The Hazus flood hazard analysis module was used to identify and characterize the flood hazards and the subsequent loss-potential or risk for both riverine and coastal flooding impacts. The standard methodology of defining loss potential for any given hazard, includes annualizing the potential over a series of statistical return periods. Annualization is the mathematical method of converting individual losses to a weighted-average that may be experienced in any given year. This Plan's scope of analysis examines risk by annualizing the impact of flooding from the 0.2%, 1%, 2%, 4%, and 10% annual chance return periods. In layman's-terms these same annual-chance return periods are often described as the 500-year, 100-year, 50-year, 25-year and 10-year events as shown in Table 35. Coastal flood risk is usually represented by a single event, the one-percent-annual chance return period that incorporates both storm surge and wave-run-up values. This study has developed storm surge return periods to match the riverine flood hazard events so an annualized flood loss can be established.

Table 35: Annual probability for flood hazard recurrence intervals.

Flood Recurrence Interval	Annual Chance of Occurrence
10-year	10.0%
25-year	4.0%
50-year	2.0%
100-year	1.0%
500-year	0.2%

Each of these flood hazard return periods represent a statistical event of the chance of being equaled or exceeded in any given year; i.e., the likelihood that a particular event with a given intensity occurs on average per year. Once each of these statistical return periods are calculated, an annualized value is computed offering a perspective for any given year.

The flood modeling performed as part of the current Plan update, and the respective risk results, represents estimated flood losses for each statistical return period and then the annualized flood losses. However, it is important to note that the idiom of 'comparing apples with oranges' very-much applies to the various elements of flood modeling as well as modeling risk from potential flooding. Therefore, where appropriate differing modeling methodologies and their respective results have been separated for comparative purposes as described and highlighted in the bulleted list below. The same list also presents the order in which Hazus modeling information is presented in this report:

The flood hazard modeling performed includes the following:

- FEMA Floodplains and Depth Grid Information
- Hazus Building Stock (Inventory of Buildings and Facilities):
    - All modeling utilized default Hazus building inventory values (Version 4.2 – US Census Bureau 2010 Building Stock Data)
    - All modeling utilized default Hazus Dasymetric Census Geographies

- All modeling utilized default Hazus essential facilities

- **Hazus Levels 1 and 2 Multi-frequency Flood Modeling** –Hazus derived flood hazards were combined with FEMA's detailed engineering modeling of flood hazards as published on FEMA's Map Service Center. The following core inputs and parameters were included in this study:
  - All GIS grid products are in Universal Transverse Mercator (UTM) Projection with X,Y (North American Datum of 1983), and Z units (North American Vertical Datum of 1988) in Feet. All GIS grid products were created or converted to a 10-ft grid cell size for analysis.
  - Digital Elevation Model (DEM) – National Elevation Dataset (NED) One-Arc Second (~30 meter resolution)
  - Frequencies (Both Riverine & Coastal hazards) - 0.2%, 1%, 2%, 4%, and 10%. No grid is created representing an annualized depth of flooding. Annualized results are derived from the loss estimation.
  - FEMA's Riverine and Coastal analysis is completed by Hydrologic Unit Code (HUC) and data from two HUCs were available to be incorporated as a Level 2 update for flood hazard analysis. These HUCs provided updated data for portions of Essex, King & Queen, Middlesex, Gloucester and Mathews Counties. FEMA does not have updated data for King William County. Data were imported from:
    - FRD_02080104_GeoDatabase_20201006
    - FRD_02080102_GeoDatabase_20201006
  - Riverine:
    - Level 1 - One-Square Mile (sq mi) Drainage Threshold for places where there were no updated data from FEMA, such as King William County,
    - Level 2 – FEMA's engineering detailed studies produced depth grids for all return periods.
  - Coastal:
    - Level 2
      - FEMA's detailed engineering analysis provided an update to the one-percent-annual chance return period for coastal hazards that combines both surge and wave run-up analysis for a limited spatial area.
      - "Starting Stillwater Elevations" as published in the Flood Insurance Study's (FIS) Table 2 – Transect Data (see each FEMA FIS document for the table details) from each respective FEMA Flood Insurance Study (FIS) to develop depth grids for return periods other than the one-percent-annual chance:
        - ESSEX COUNTY – Revised May 4, 2015
        - GLOUCESTER COUNTY – Revised November 19, 2014
        - KING AND QUEEN COUNTY – Preliminary October 3, 2013
        - KING WILLIAM COUNTY – Preliminary October 3, 2013
        - MIDDLESEX COUNTY – Revised May 18, 2015
        - MATHEWS COUNTY – Revised December 9, 2014
      - Hazus default shoreline data was modified to extend up the York River so that Level 1 coastal modeling could be completed for King William County, King and Queen County, and portions of Gloucester County upstream of the George Washington Memorial Highway Bridge (US 17).

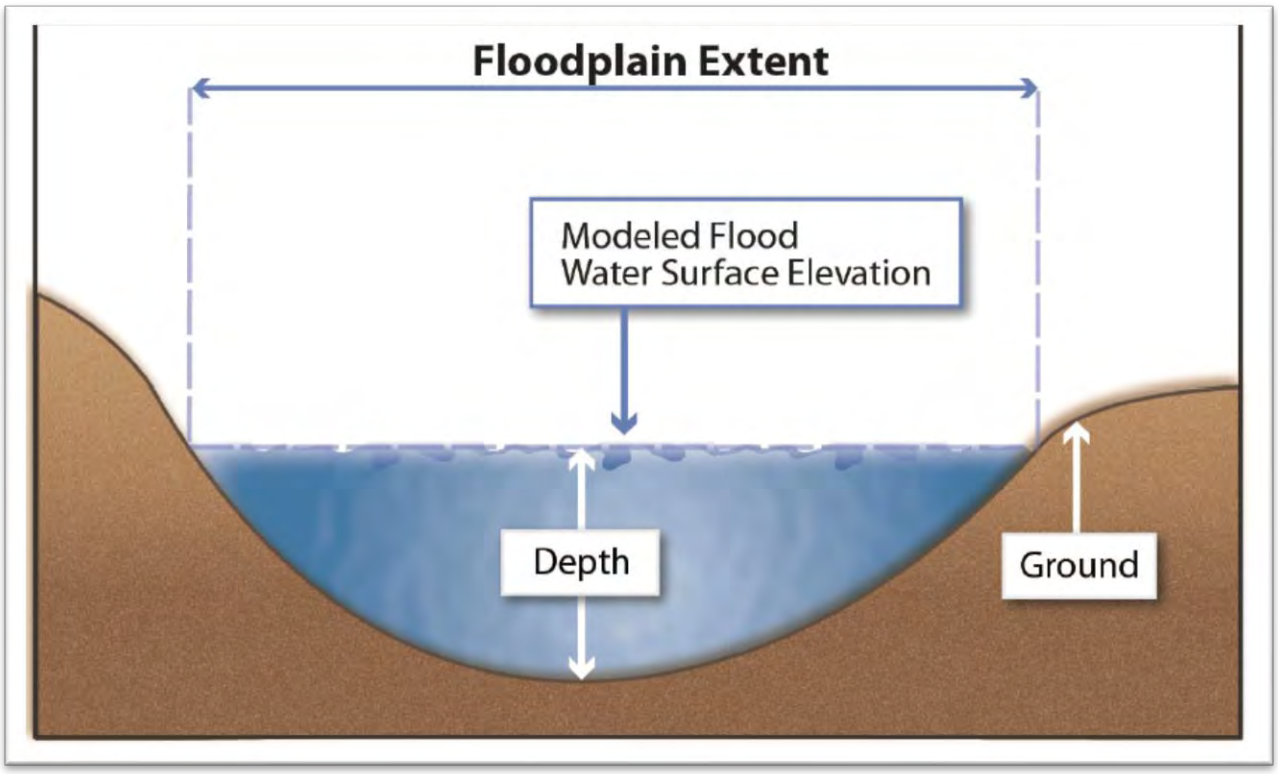
- **Hazus Level 1 Analysis and Summary of Losses**– Analysis for annualized losses and losses for each return period:
    - Level 1
        - Multiple frequencies (each return period available for riverine and coastal)
            - Hazus default general building stock is analyzed for each return period and then summarized as loss totals by dollars of building and contents loss, and dollars of business interruption.
            - Hazus default essential facilities losses have totals summarized by dollars of building and content's loss, along with an estimate of time to full restoration of the function of that facility
        - Annualized (riverine and coastal)
            - General building stock is processed for annualized loss analysis summarized as loss totals by dollars of building and contents loss, and by capita. Summaries are also built for general occupancy class type, and construction material.
            - Hazus does not provide this analysis methodology for Essential Facilities
    - Results will be presented in the narrative, tables, and maps as losses due to riverine hazards, losses due to coastal hazards, and then the combined impact of both hazard types.

FEMA Floodplains and Depth Grid Information

FEMA initiates Flood Insurance Studies (FIS) on a national prioritization schedule. The most recent FIS's have been incorporated into this Plan as outlined by date in the list above; dates ranging from 2013 to 2020. These various new studies have produced updated riverine and coastal flood hazards for most of the jurisdictions in the Middle Peninsula planning area. The new riverine coastal flood hazards associated with the most recent FEMA studies have been produced under the Risk MAP Program. In short, the Risk MAP Program seeks to include risk assessments as part of an FIS to better communicate the risk of flooding. Consequently, a Risk MAP study includes all of the regulatory FIS products; namely engineering, floodplain mapping, digital FIRM data and report text. However, in addition to the traditional regulatory products, Risk MAP also includes new non-regulatory products aimed at communicating risk. One of the core non-regulatory datasets that FEMA develops includes the creation of depth grids from the digital FIRM data. Depth grids are the key to performing risk assessments in the Hazus software as they are able to be directly imported from authoritative sources of engineering modeling. Figures 42 and 43 illustrates the extent of flood hazards as defined by the most recent FEMA flood insurance studies that were incorporated into this study making this a Level 2 hazard data analysis.

The flood hazard within Hazus is ultimately defined by a depth grid which is a representation of the difference between the estimated water surface and ground elevations for each respective flood frequency or annual chance.

The following image is a simplified representation as shown in FEMA's Guidance for Flood Risk Analysis and Mapping, Flood Depth and Analysis Grids (May 2014):



The new Risk MAP projects for each of the counties in the Middle Peninsula Regional include new riverine coastal one-percent-annual-chance depth grids. Figure 39 shows these new coastal one-percent-annual chance depth grids and the new FEMA digital FIRM floodplains.

Figure 39: FEMA Level 2 Depth Grids.

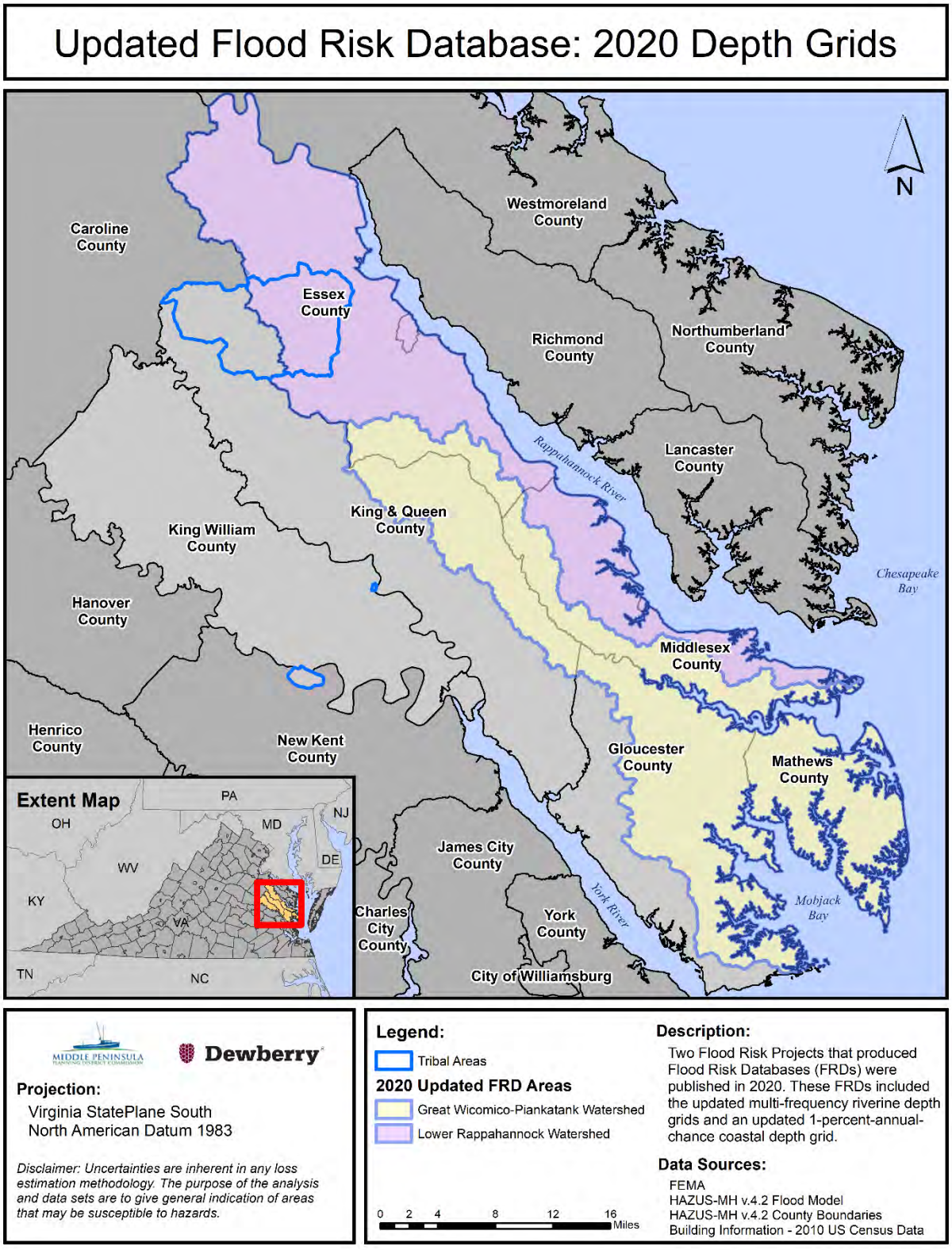
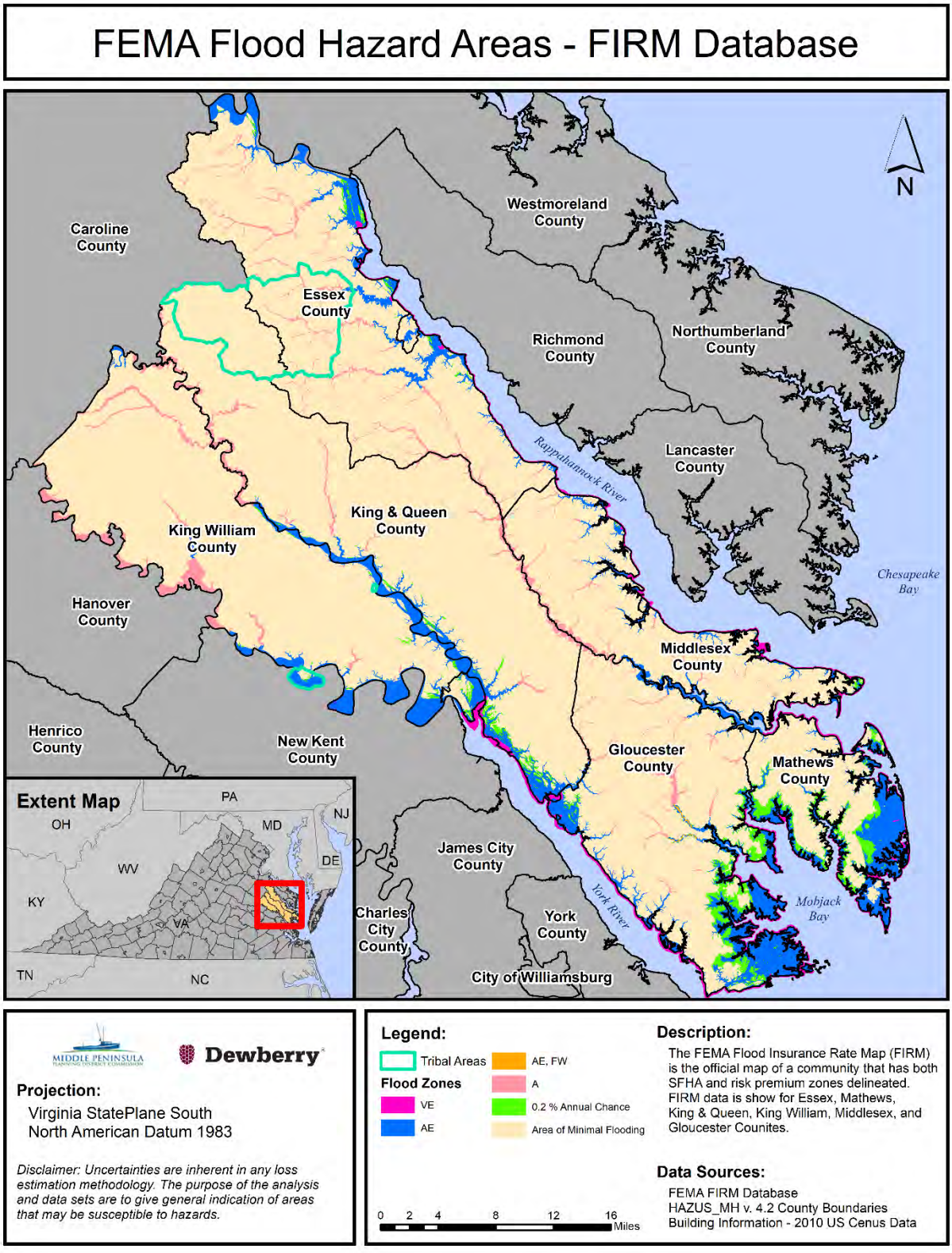
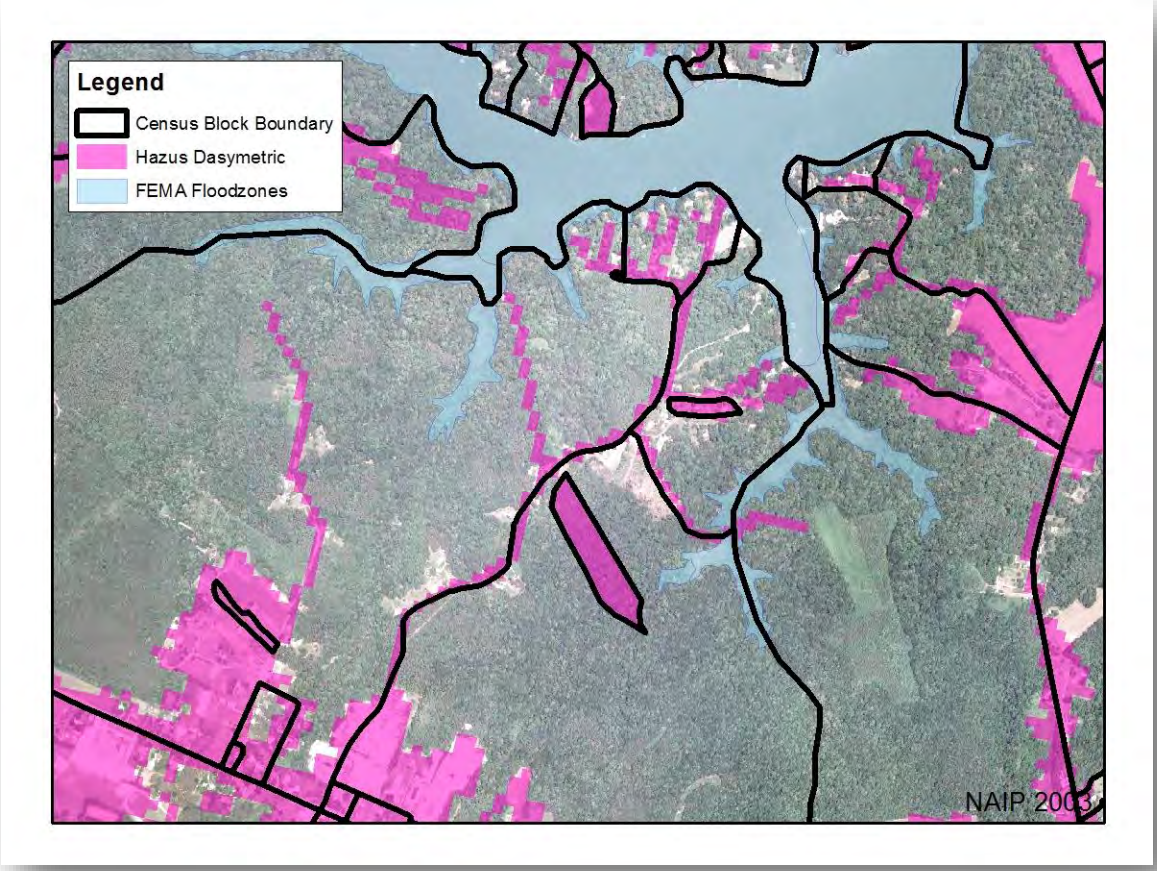


Figure 40: Level I Hazards.



Hazus Building Stock (Inventory of Buildings and Facilities)
Hazus general building stock is an inventory of the built environment that is at risk of damage by a hazard. Each respective type or sub-type of buildings in the following categories; residential, commercial, industrial, agricultural, religious, government, and education has risk based on the replacement value for buildings in that use category, the size and construction of these buildings, and the replacement cost to rebuild if the building is destroyed. For the damage calculations, Hazus assumes that all buildings are evenly distributed throughout a given census block and therefore damage is estimated as a percent and is weighted by the area of inundation at a given depth for a given census block. The methodology therefore, is known as an area-weighted methodology.

FEMA has initiated recent improvements to the area-weighted methodology by further refining the distribution of building square-footage to land areas characterized by development and removing land areas typical of non-developed land classes (e.g., forests, wetlands, etc…). This refinement is called dasymetric mapping and the current Plan modeling utilizes the FEMA dasymetric building stock. The following image shows a small example area in which the developed areas are pink:



Use of the new dasymetric data will typically reduce the total area subject to area-weighted loss estimations - particularly for those census blocks that have flood risk but no actual development within the floodplains. An area analysis of the dasymetric versus full stock census blocks is compared in the following table:

Digital FIRM Acreage Type	Census Block Type	
	Dasymetric	Entire Census Block
Acres of 0.2% Annual Chance Floodplains (500-year)	29,199 Acre (3.5% of Total Acres)	127,531 Acre (15.2% of Total Acres)
Acres of 1% Annual Chance Floodplains (100-year)	23,288 Acre (2.8% of Total Acres)	111,222 Acre (13.3% of Total Acres)
Total Acres of Census Blocks Middle Peninsula Region		**836,632 Acres**

A comparison of FEMA's digital FIRM data intersecting the two types of Hazus census blocks reveals that an estimated 3.5% of the dasymetric data is within the extents of the 0.2-percent-annual chance flood hazard area versus 15.2% when using full census blocks. And, considering the 1-percent-annual chance flood hazard area, there is approximately 2.8% intersecting the dasymetric data versus 13.3% when using full census blocks. Consequently, this refinement can be considered a benefit to the risk analyses in that the expectation of over-estimations are mitigated by limiting potential losses to developed areas.

Loss estimations are first based on inundation area for specified sub-types of building's cost per square-footage. The second type of data includes information on the local economy that is used in estimating losses. Table 35 displays the economic loss categories used to calculate annualized losses by Hazus. Data for this analysis has been provided at the census block level.

Table 35: Hazus direct economic loss categories and descriptions.

Category Name	Description of Data Input into Model	Hazus Output
Building	Cost per sq ft to repair damage by structural type and occupancy for each level of damage	Cost of building repair or replacement of damaged and destroyed buildings
Contents	Replacement value by occupancy	Cost of damage to building contents
Inventory	Annual gross sales in $ per sq ft	Loss of building inventory as contents related to business activities
Relocation	Multiple factors; primarily a function of Rental Costs ($/ft2/month) for non-entertainment buildings where damage ≥10%	Relocation expenses (for businesses and institutions); disruption costs to building owners for temporary space.
Income	Income in $ per sq ft per month by occupancy	Capital-related incomes losses as a measure of the loss of productivity, services, or sales
Rental	Rental costs per month per sq ft by occupancy	Loss of rental income to building owners
Wage	Wages in $ per sq ft per month by occupancy	Employee wage loss as described in income loss

The Middle Peninsula Planning District Commission currently has approximately 46,146 structures with an estimated potential exposure of the built environment of approximately $19.7 billion. Average estimated replacement value of buildings in the study area range from approximately $318,000 to $490,000, with the mean approximation value of $412,000. Eighty-Two percent of the planning district's general occupancy is categorized as residential, and 11% is commercial. Table 36 provides inventory information for each of the six counties that were included in the analysis. Gloucester County occupies a largest percentage (40%) of the building stock exposure for the region.

Table 36: Building stock exposure for general occupancies by county.

County	Residential	Commercial	Industrial	Agriculture	Religion	Govt.	Education	Total $ and % of Total
Essex	$1,690,695	$404,683	$149,121	$21,320	$38,252	$20,307	$36,124	$2,360,502 (12%)
Gloucester	$6,468,784	$879,665	$164,938	$28,290	$116,120	$36,529	$196,149	$7,890,475 (40%)
King & Queen	$992,231	$57,304	$30,890	$5,828	$27,490	$3,346	$8,736	$1,125,825 (6%)
King William	$2,799,158	$294,544	$118,245	$28,276	$57,502	$27,319	$29,734	$3,354,778 (17%)
Mathews	$1,739,804	$159,583	$50,753	$8,584	$27,408	$7,692	$14,446	$2,008,270 (10%)
Middlesex	$2,431,988	$379,226	$69,110	$12,200	$36,784	$13,212	$48,482	$2,991,002 (15%)
Total	**$16,122,660**	**$2,175,005**	**$583,057**	**$104,498**	**$303,556**	**$108,405**	**$333,671**	**$19,730,852**
% of Total	82%	11%	3%	< 1%	2%	< 1%	2%	100%

All values are in thousands of dollars.
Note: Total exposure differs between exporting by building occupancy versus building construction type due to rounding issues in the Hazus data estimation equations.

Building stock exposure is also classified by building type. General Building Types (GBTs) have been developed as a means to classify the different building types. This provides an ability to differentiate between buildings with substantially different damage and loss characteristics. Building types represent the characteristics of a typical building in its class. The damage and loss prediction models are developed for each building type. The estimated performance of a building type is based upon the "average characteristics" of the total population of buildings within each class. Five general classifications have been established, including wood, masonry, concrete, steel and manufactured homes. A brief description of the building types is available in Table 37. The Hazus inventory serves as the default when a user does not have better data available.

Table 37: Hazus general building type classes.

General Building Type	Description
Wood	Wood frame construction
Masonry	Reinforced or unreinforced masonry construction
Steel	Steel frame construction
Concrete	Cast-in-place or pre-cast reinforced concrete construction
Manufactured Home	Factory-built residential construction

Wood construction represents the majority (62%) of building types in the planning district. Masonry construction accounts for nearly a quarter (25%) of the building types. Table 38 provides building stock exposure for these five main building types.

Table 38: Building stock exposure for general building construction type by county.

County	Wood	Masonry	Concrete	Steel	Manufactured Home	Total
Essex	$739,917	$277,995	$12,384	$54,013	$41,811	$1,126,120
Gloucester	$4,926,253	$2,004,985	$184,550	$629,434	$145,376	$7,890,598
King & Queen	$1,296,670	$500,835	$34,312	$122,743	$53,977	$2,008,537
King William	$2,152,946	$851,390	$65,898	$244,516	$40,194	$3,354,944
Mathews	$1,289,067	$592,340	$101,638	$323,107	$54,516	$2,360,668
Middlesex	$1,845,893	$762,017	$70,862	$242,371	$70,147	$2,991,290
Total	**$12,250,746**	**$4,989,562**	**$469,644**	**$1,616,184**	**$406,021**	**$19,732,157**
% of Total	62%	25%	3%	8%	2%	100%
All values are in thousands of dollars ***Note: Total exposure differs between exporting by building occupancy versus building construction type of $1,305 due to rounding issues in the Hazus data estimation equations.***						

Multi-Frequency Riverine and Coastal Flood Modeling – Results

Tables 39 to 45 show the multi-frequency results for riverine hazards, coastal hazards, and the combined impact of both hazards for the Middle Peninsula Region and each County. Flood hazard damage dollars are calculated based on a depth-damage curve in Hazus applied to the replacement cost per square footage of the building to get a damage cost. These costs are calculated for a Census Block which are summarized for each County.

Table 39: Middle Peninsula Regional summary of multi-frequency flood damage building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Disruption
Riverine Results					
All Counties	10-percent-annual-chance event	$6,104	$2,984	$1,906	$1,214
All Counties	4-percent-annual-chance event	$10,148	$5,103	$3,193	$1,852
All Counties	2-percent-annual-chance event	$11,685	$5,916	$3,681	$2,088
All Counties	1-percent-annual-chance event	$12,496	$6,370	$3,910	$2,216
All Counties	0.2-percent-annual-chance event	$16,440	$8,632	$5,367	$2,441
Coastal Results					
All Counties	10-percent-annual-chance event	$271,438	$83,571	$62,781	$62,543
All Counties	4-percent-annual-chance event	$338,809	$108,861	$81,028	$74,460
All Counties	2-percent-annual-chance event	$476,059	$161,805	$119,470	$97,392
All Counties	1-percent-annual-chance event	$621,101	$211,662	$156,991	$126,224
All Counties	0.2-percent-annual-chance event	$2,126,639	$777,140	$573,157	$388,171
Combined Riverine and Coastal Results					
All Counties	10-percent-annual-chance event	$278,756	$86,555	$64,687	$63,757
All Counties	4-percent-annual-chance event	$350,809	$113,964	$84,221	$76,312
All Counties	2-percent-annual-chance event	$489,832	$167,721	$123,151	$99,480
All Counties	1-percent-annual-chance event	$635,813	$218,032	$160,901	$128,440
All Counties	0.2-percent-annual-chance event	$2,145,520	$785,772	$578,524	$390,612
All values are in thousands of dollars					

Table 40: Essex County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Disruption
Riverine Results					
Essex County	10-percent-annual-chance event	$61	$26	$11	$12
Essex County	4-percent-annual-chance event	$105	$51	$26	$14
Essex County	2-percent-annual-chance event	$130	$70	$32	$14
Essex County	1-percent-annual-chance event	$161	$87	$44	$15
Essex County	0.2-percent-annual-chance event	$273	$150	$79	$22
Coastal Results					
Essex County	10-percent-annual-chance event	$20,864	$6,246	$4,592	$5,013
Essex County	4-percent-annual-chance event	$25,117	$7,857	$5,950	$5,655
Essex County	2-percent-annual-chance event	$34,053	$11,358	$8,469	$7,113
Essex County	1-percent-annual-chance event	$36,698	$12,234	$9,106	$7,679
Essex County	0.2-percent-annual-chance event	$76,309	$28,640	$21,279	$13,195
Combined Riverine and Coastal Results					
Essex County	10-percent-annual-chance event	$20,925	$6,272	$4,603	$5,025
Essex County	4-percent-annual-chance event	$25,222	$7,908	$5,976	$5,669
Essex County	2-percent-annual-chance event	$34,183	$11,428	$8,501	$7,127
Essex County	1-percent-annual-chance event	$36,859	$12,321	$9,150	$7,694
Essex County	0.2-percent-annual-chance event	$76,582	$28,790	$21,358	$13,217
All values are in thousands of dollars					

Table 41: Gloucester County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Interruption
Riverine Results					
Gloucester County	10-percent-annual-chance event	$4,080	$1,400	$1,018	$831
Gloucester County	4-percent-annual-chance event	$4,502	$1,571	$1,133	$899
Gloucester County	2-percent-annual-chance event	$4,798	$1,711	$1,219	$934
Gloucester County	1-percent-annual-chance event	$4,342	$1,532	$1,050	$880
Gloucester County	0.2-percent-annual-chance event	$5,863	$2,272	$1,597	$997
Coastal Results					
Gloucester County	10-percent-annual-chance event	$154,036	$44,690	$34,858	$37,244
Gloucester County	4-percent-annual-chance event	$189,929	$58,427	$44,840	$43,331
Gloucester County	2-percent-annual-chance event	$263,119	$87,486	$66,375	$54,629
Gloucester County	1-percent-annual-chance event	$337,821	$113,743	$86,876	$68,601
Gloucester County	0.2-percent-annual-chance event	$1,369,365	$553,523	$394,102	$210,870
Combined Riverine and Coastal Results					
Gloucester County	10-percent-annual-chance event	$158,116	$46,090	$35,876	$38,075
Gloucester County	4-percent-annual-chance event	$194,431	$59,998	$45,973	$44,230
Gloucester County	2-percent-annual-chance event	$267,917	$89,197	$67,594	$55,563
Gloucester County	1-percent-annual-chance event	$342,163	$115,275	$87,926	$69,481
Gloucester County	0.2-percent-annual-chance event	$1,375,228	$555,795	$395,699	$211,867
All values are in thousands of dollars					

Table 42: King & Queen County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Interruption
Riverine Results					
King & Queen County	10-percent-annual-chance event	$240	$151	$65	$12
King & Queen County	4-percent-annual-chance event	$337	$213	$94	$15
King & Queen County	2-percent-annual-chance event	$404	$255	$111	$19
King & Queen County	1-percent-annual-chance event	$480	$300	$138	$21
King & Queen County	0.2-percent-annual-chance event	$602	$373	$177	$26
Coastal Results					
King & Queen County	10-percent-annual-chance event	$8,145	$3,834	$2,421	$945
King & Queen County	4-percent-annual-chance event	$10,370	$4,884	$3,060	$1,213
King & Queen County	2-percent-annual-chance event	$14,516	$6,910	$4,306	$1,650
King & Queen County	1-percent-annual-chance event	$17,794	$8,451	$5,345	$1,999
King & Queen County	0.2-percent-annual-chance event	$41,356	$20,037	$12,505	$4,407
Combined Riverine and Coastal Results					
King & Queen County	10-percent-annual-chance event	$8,385	$3,985	$2,486	$957
King & Queen County	4-percent-annual-chance event	$10,707	$5,097	$3,154	$1,228
King & Queen County	2-percent-annual-chance event	$14,920	$7,165	$4,417	$1,669
King & Queen County	1-percent-annual-chance event	$18,274	$8,751	$5,483	$2,020
King & Queen County	0.2-percent-annual-chance event	$41,958	$20,410	$12,682	$4,433
All values are in thousands of dollars					

Table 43: King William County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Interruption
Riverine Results					
King William County	10-percent-annual-chance event	$2,790	$1,340	$784	$333
King William County	4-percent-annual-chance event	$6,894	$3,193	$1,903	$899
King William County	2-percent-annual-chance event	$8,256	$3,798	$2,278	$1,090
King William County	1-percent-annual-chance event	$9,559	$4,372	$2,643	$1,272
King William County	0.2-percent-annual-chance event	$11,954	$5,744	$3,472	$1,369
Coastal Results					
King William County	10-percent-annual-chance event	$27,939	$8,530	$7,935	$5,737
King William County	4-percent-annual-chance event	$31,502	$9,938	$9,170	$6,197
King William County	2-percent-annual-chance event	$37,947	$12,445	$11,378	$7,062
King William County	1-percent-annual-chance event	$50,041	$13,677	$13,062	$11,651
King William County	0.2-percent-annual-chance event	$332,192	$56,306	$66,274	$104,806
Combined Riverine and Coastal Results					
King William County	10-percent-annual-chance event	$30,729	$9,870	$8,719	$6,070
King William County	4-percent-annual-chance event	$38,396	$13,131	$11,073	$7,096
King William County	2-percent-annual-chance event	$46,203	$16,243	$13,656	$8,152
King William County	1-percent-annual-chance event	$59,600	$18,049	$15,705	$12,923
King William County	0.2-percent-annual-chance event	$344,146	$62,050	$69,746	$106,175
All values are in thousands of dollars					

Table 44: Mathews County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Interruption
Riverine Results					
Mathews County	10-percent-annual-chance event	$11	$1	$0	$5
Mathews County	4-percent-annual-chance event	$14	$3	$1	$5
Mathews County	2-percent-annual-chance event	$25	$6	$1	$9
Mathews County	1-percent-annual-chance event	$29	$10	$3	$8
Mathews County	0.2-percent-annual-chance event	$33	$12	$5	$8
Coastal Results					
Mathews County	10-percent-annual-chance event	$29,332	$1,340	$784	$13,604
Mathews County	4-percent-annual-chance event	$41,224	$3,193	$1,903	$18,064
Mathews County	2-percent-annual-chance event	$59,952	$3,798	$2,278	$26,938
Mathews County	1-percent-annual-chance event	$79,603	$4,372	$2,643	$36,294
Mathews County	0.2-percent-annual-chance event	$119,002	$5,744	$3,472	$54,893
Combined Riverine and Coastal Results					
Mathews County	10-percent-annual-chance event	$29,343	$1,341	$784	$13,609
Mathews County	4-percent-annual-chance event	$41,238	$3,196	$1,904	$18,069
Mathews County	2-percent-annual-chance event	$59,977	$3,804	$2,279	$26,947
Mathews County	1-percent-annual-chance event	$79,632	$4,382	$2,646	$36,302
Mathews County	0.2-percent-annual-chance event	$119,035	$5,756	$3,477	$54,901
All values are in thousands of dollars					

Table 45: Middlesex County multi-frequency building stock losses.

Area	Scenario	Total Losses	Building Losses	Content Losses	Business Interruption
Riverine Results					
Middlesex County	10-percent-annual-chance event	$136	$66	$28	$21
Middlesex County	4-percent-annual-chance event	$148	$72	$36	$20
Middlesex County	2-percent-annual-chance event	$160	$76	$40	$22
Middlesex County	1-percent-annual-chance event	$141	$69	$32	$20
Middlesex County	0.2-percent-annual-chance event	$156	$81	$37	$19
Coastal Results					
Middlesex County	10-percent-annual-chance event	$271,438	$83,571	$62,781	$62,543
Middlesex County	4-percent-annual-chance event	$338,809	$108,861	$81,028	$74,460
Middlesex County	2-percent-annual-chance event	$476,059	$161,805	$119,470	$97,392
Middlesex County	1-percent-annual-chance event	$621,101	$211,662	$156,991	$126,224
Middlesex County	0.2-percent-annual-chance event	$2,126,639	$777,140	$573,157	$388,171
Combined Riverine and Coastal Results					
Middlesex County	10-percent-annual-chance event	$278,756	$86,555	$64,687	$63,757
Middlesex County	4-percent-annual-chance event	$350,809	$113,964	$84,221	$76,312
Middlesex County	2-percent-annual-chance event	$489,832	$167,721	$123,151	$99,480
Middlesex County	1-percent-annual-chance event	$635,813	$218,032	$160,901	$128,440
Middlesex County	0.2-percent-annual-chance event	$2,145,520	$785,772	$578,524	$390,612
All values are in thousands of dollars					

General Building Stock Annualized Flood Losses

Annualization is the mathematical method of converting individual losses to a weighted-average that may be experienced in any given year. Annualized loss is the preferred measure with which to express potential risk for hazard mitigation planning as it is useful for creating a common denominator by which different types of hazards may be compared. Annualized losses compared across a region, may indicate targeted areas for prioritization of hazard mitigation actions. Areas with signification annualized losses may be subject to not only local flooding (nuisance flooding) but also frequent storm event flooding as well.

Hazus riverine flood model annualized losses for the Middle Peninsula are $889,000. Property or "capital stock" losses are $761,000 and make up about 85.6% of the damages which includes the values for building, content, and inventory. Business interruption accounts for $128,000 (14.4%) of the annualized losses and includes relocation, income, rental, and wage costs.

Hazus coastal flood model annualized losses for the Middle Peninsula are $40,020,000. Property or "capital stock" losses are $29,881,000 and make up about 74.7% of the damages. Business interruption accounts for $10,139,000 (25.3%) of the annualized losses.

Hazus combined flood model annualized losses for the Middle Peninsula are $40,909,000. Property or "capital stock" losses are $30,642,000 and make up about 74.9% of the damages. Business interruption accounts for $10,267,000 (25.1%) of the annualized losses. Of the combined annualized losses, riverine losses account for only 2.2% of the combined loss, whereas coastal losses account for 97.8% of the combined loss.

The flood model incorporates National Flood Insurance Program (NFIP) entry dates to distinguish Pre-FIRM and Post-FIRM data from the census blocks. Pre-Firm buildings constructed prior to the initial FIRM are considered "pre-FIRM" and those constructed on or after the initial FIRM are considered "post-FIRM". This distinction is important because post-FIRM buildings were built above the base flood elevation (BFE), which makes those buildings less susceptible to flooding. This results in different damage curves between pre- and post-FIRM buildings. If the different curves were not used for these two categories of structures, the results would be skewed and the loss estimates inaccurate. The results provided in this report show the combined total losses for both pre- and post-FIRM values combined.

Losses are calculated for riverine hazards, costal hazards, and then a combination of both hazards. This separation by hazard class may also help focus or target specific mitigation actions that may differ riverine to coastal areas.

Table 47 illustrates the expected annualized losses broken down by county and Table 48 includes the annualized losses along with Population and Per-Capita losses.

Table 46: Annualized losses for pre and post-FIRM buildings.

County	Building Losses	Content Losses	Inventory Losses	Relocation	Income Losses	Rental Losses	Wage Losses	Annualized Losses
Riverine Results								
Essex	$1	$1	$0	$0	$0	$0	$0	$2
Gloucester	$153	$104	$0	$25	$9	$6	$31	$328
King & Queen	$16	$8	$0	$0	$0	$0	$0	$24
King William	$295	$172	$0	$34	$1	$10	$11	$523
Mathews	$0	$0	$0	$0	$0	$0	$0	$0
Middlesex	$7	$4	$0	$1	$0	$0	$0	$12
Middle Peninsula Region	$472	$289	$0	$60	$10	$16	$42	$889
Coastal Results								
Essex	$959	$709	$5	$270	$105	$83	$171	$2,302
Gloucester	$9,367	$7,009	$34	$2,172	$956	$626	$1,639	$21,803
King & Queen	$608	$389	$6	$106	$0	$29	$1	$1,139
King William	$1,293	$1,268	$8	$207	$192	$100	$687	$3,755
Mathews	$3,674	$2,404	$15	$1,356	$155	$375	$260	$8,239
Middlesex	$1,290	$842	$1	$328	$107	$90	$124	$2,782
Middle Peninsula Region	$17,191	$12,621	$69	$4,439	$1,515	$1,303	$2,882	$40,020
Combined Riverine and Coastal Results								
Essex	$960	$710	$5	$270	$105	$83	$171	$2,304
Gloucester	$9,520	$7,113	$34	$2,197	$965	$632	$1,670	$22,131
King & Queen	$624	$397	$6	$106	$0	$29	$1	$1,163
King William	$1,588	$1,440	$8	$241	$193	$110	$698	$4,278
Mathews	$3,674	$2,404	$15	$1,356	$155	$375	$260	$8,239
Middlesex	$1,297	$846	$1	$329	$107	$90	$124	$2,794
Middle Peninsula Region	$17,663	$12,910	$69	$4,499	$1,525	$1,319	$2,924	$40,909
All values are in thousands of dollars								

Table 47: Annualized losses and per-capita losses.

County	Population[1]	Annualized Losses	Per-Capita Losses
Riverine Results			
Essex	11,151	$2,000	$0.18
Gloucester	36,858	$328,000	$8.90
King & Queen	6,945	$24,000	$3.46
King William	15,935	$523,000	$32.82
Mathews	8,978	< $1,000	< $0.11
Middlesex	10,959	$12,000	$1.09
Middle Peninsula Region	90,826	$889,000	$9.79
Coastal Results			
Essex	11,151	$2,302,000	$206.44
Gloucester	36,858	$21,803,000	$591.54
King & Queen	6,945	$1,139,000	$164.00
King William	15,935	$3,755,000	$235.64
Mathews	8,978	$8,239,000	$917.69
Middlesex	10,959	$2,782,000	$253.86
Middle Peninsula Region	90,826	$40,020,000	$440.62
Combined Riverine and Coastal Results			
Essex	11,151	$2,304,000	$206.62
Gloucester	36,858	$22,131,000	$600.44
King & Queen	6,945	$1,163,000	$167.46
King William	15,935	$4,278,000	$268.47
Mathews	8,978	$8,239,000	$917.69
Middlesex	10,959	$2,794,000	$254.95
Middle Peninsula Region	90,826	$40,909,000	$450.41
1 2010 Census-based population counts - as exists within Hazus stock data.			

King William County has the highest riverine annualized losses, $523,000, accounting for 58.8% of the total riverine losses for Middle Peninsula and ranks first in terms of per-capita losses at $32.82. Gloucester County has the highest coastal annualized losses, $21,803,000, accounting for 53.3% of the total coastal losses for Middle Peninsula and ranks second in terms of per-capita coastal losses at $591.54. Gloucester County also has the highest combined annualized losses, $22,131,000, accounting for 54.1% of the total coastal losses for Middle Peninsula. It continues to rank second in terms of per-capita losses, with a combined value of $600.44. The majority of the expected damages can be attributed to building and content value.

Gloucester County also has the second highest riverine losses, $328,000, accounting for 36.9% of the total riverine annualized losses for the Middle Peninsula and ranks second in terms of annualized per-capita riverine loss at $8.90. Mathews County has the second highest coastal losses, $8,239,000, accounting for 20.6% of the total coastal annualized losses for the Middle Peninsula and ranks first in terms of annualized per-capita coastal loss at $917.69. Mathews County has the second highest combined losses as well, but as it has no annual riverine losses greater than $1,000 and therefore had no recorded riverine annual loss, all values are identical to Mathews County coastal losses.

Riverine building value losses account for approximately 52% of the expected riverine annualized damages and 32.1% is attributed to content value losses. Coastal building value losses account for approximately 42.85% of the expected coastal annualized damages and 31.49% is attributed to content value losses. Combined building value losses account for approximately 43.1% of the expected annualized damages and 31.5% is attributed to content value losses.

Residential building damage represents the majority of the damages, followed closely by the residential content damages for the riverine, coastal, and combined hazards. Wood buildings account for $608,000, or 68.4% of the riverine annualized damages of which the majority are in King William County. Wood still accounts for the majority of damage in the coastal ($24,109,000; 60.2%) and combined ($24,717,000; 60.4%) hazards as well. However, for both the coastal and the combined hazards, the county with the majority of damages is Gloucester County, with $21,803,000 annually for coastal and $22,131,000 annually combined. Occupancy results indicate that agricultural, non-profit and industrial have the largest percent of exposure at risk; i.e. these are the predominant occupancy types that intersect the flood hazard. Manufactured homes only account for 3.3% of the combined annualized damages but have the highest percentage of building stock at risk to yearly damages. Tables 49 and 50 summarize the property losses and business interruption losses shown by occupancy and building type. The slight differences in the annualized losses for building type and occupancy can be attributed to the Hazus classification methodology as seen in Tables 50 and 51.

Table 48: Middle Peninsula Region annualized losses by building type.

Construction Type	Building Losses	Content Losses	Inventory Losses	Relocation	Income Losses	Rental Losses	Wage Losses	Annualized Losses
Riverine Results								
Wood	$350	$191	$0	$47	$0	$14	$6	$608
Masonry	$111	$67	$0	$13	$3	$2	$13	$209
Steel	$5	$26	$0	$0	$7	$0	$22	$60
Manufactured Housing	$6	$1	$0	$0	$0	$0	$0	$7
Concrete	$0	$4	$0	$0	$0	$0	$1	$5
Sub-Total	$472	$289	$0	$60	$10	$16	$42	$889
Percentage	53%	33%	0%	7%	1%	1%	5%	100%
Coastal Results								
Wood	$11,873	$7,652	$3	$2,915	$316	$873	$477	$24,109
Masonry	$4,168	$3,214	$9	$1,045	$470	$288	$882	$10,076
Steel	$324	$1,121	$51	$190	$591	$99	$1,178	$3,554
Manufactured Housing	$752	$341	$0	$252	$0	$15	$0	$1,360
Concrete	$74	$293	$6	$37	$138	$28	$345	$921
Sub-Total	$17,191	$12,621	$69	$4,439	$1,515	$1,303	$2,882	$40,020
Percentage	43%	31%	1%	11%	4%	3%	7%	100%
Combined Riverine and Coastal Results								
Wood	$12,223	$7,843	$3	$2,962	$316	$887	$483	$24,717
Masonry	$4,279	$3,281	$9	$1,058	$473	$290	$895	$10,285
Steel	$329	$1,147	$51	$190	$598	$99	$1,200	$3,614
Manufactured Housing	$758	$342	$0	$252	$0	$15	$0	$1,367
Concrete	$74	$297	$6	$37	$138	$28	$346	$926
Total	$17,663	$12,910	$69	$4,499	$1,525	$1,319	$2,924	$40,909
Percentage	43%	31%	1%	11%	4%	3%	7%	100%
All values are in thousands of dollars								

Table 49: Middle Peninsula Region annualized losses by occupancy type.

Occupancy Type	Building Losses	Content Losses	Inventory Losses	Relocation	Income Losses	Rental Losses	Wage Losses	Annualized Losses
Riverine Results								
Residential	$444	$220	$0	$54	$0	$15	$2	$735
Commercial	$6	$36	$0	$0	$16	$0	$24	$82
Industrial	$2	$7	$0	$0	$0	$0	$0	$9
Non-Profit	$0	$7	$0	$0	$1	$0	$4	$12
Agricultural	$0	$1	$0	$0	$0	$0	$0	$1
Education	$0	$5	$0	$0	$1	$0	$7	$13
Government	$0	$2	$0	$0	$0	$0	$12	$14
Sub-Total	$452	$278	$0	$54	$18	$15	$49	$866
Percentage	52%	32%	0%	6%	2%	2%	6%	100%
Coastal Results								
Residential	$16,223	$9,842	$0	$3,814	$70	$1,046	$173	$31,168
Commercial	$422	$1,431	$22	$283	$1,110	$171	$1,329	$4,768
Industrial	$158	$333	$52	$8	$6	$1	$17	$575
Non-Profit	$45	$398	$0	$44	$115	$3	$302	$907
Agricultural	$9	$42	$2	$2	$12	$0	$3	$70
Education	$50	$340	$0	$106	$278	$9	$659	$1,442
Government	$3	$41	$0	$5	$1	$1	$484	$535
Sub-Total	$16,910	$12,427	$76	$4,262	$1,592	$1,231	$2,967	$39,465
Percentage	43%	31%	1%	11%	4%	3%	7%	100%
Combined Riverine and Coastal Results								
Residential	$16,667	$10,062	$0	$3,868	$70	$1,061	$175	$31,903
Commercial	$428	$1,467	$22	$283	$1,126	$171	$1,353	$4,850
Industrial	$160	$340	$52	$8	$6	$1	$17	$584
Non-Profit	$45	$405	$0	$44	$116	$3	$306	$919
Agricultural	$9	$43	$2	$2	$12	$0	$3	$71
Education	$50	$345	$0	$106	$279	$9	$666	$1,455
Government	$3	$43	$0	$5	$1	$1	$496	$549
Total	$17,362	$12,705	$76	$4,316	$1,610	$1,246	$3,016	$40,331
Percentage	43%	31%	1%	11%	4%	3%	7%	100%
All values are in thousands of dollars								

Table 50: County annualized losses by construction type.

County	Concrete	Masonry	Manufactured Homes	Steel	Wood	Annualized Loss
Riverine Results						
Essex	$0	$0	$0	$0	$2	$2
Gloucester	$3	$82	$2	$35	$206	$328
King & Queen	$0	$4	$0	$0	$20	$24
King William	$2	$120	$4	$25	$372	$523
Mathews	$0	$0	$0	$0	$0	$0
Middlesex	$0	$3	$1	$0	$8	$12
Middle Peninsula Region	$5	$209	$7	$60	$608	$889
Coastal Results						
Essex	$69	$570	$48	$221	$1,394	$2,302
Gloucester	$496	$5,579	$678	$2,179	$12,871	$21,803
King & Queen	$6	$268	$59	$27	$779	$1,139
King William	$256	$1,040	$9	$656	$1,794	$3,755
Mathews	$68	$1,936	$523	$317	$5,395	$8,239
Middlesex	$26	$683	$43	$154	$1,876	$2,782
Middle Peninsula Region	$921	$10,076	$1,360	$3,554	$24,109	$40,020
Combined Riverine and Coastal Results						
Essex	$69	$570	$48	$221	$1,396	$2,304
Gloucester	$499	$5,661	$680	$2,214	$13,077	$22,131
King & Queen	$6	$272	$59	$27	$799	$1,163
King William	$258	$1,160	$13	$681	$2,166	$4,278
Mathews	$68	$1,936	$523	$317	$5,395	$8,239
Middlesex	$26	$686	$44	$154	$1,884	$2,794
Middle Peninsula Region	$926	$10,285	$1,367	$3,614	$24,717	$40,909
All values are in thousands of dollars						

Table 51: County annualized losses by occupancy type.

County	Residential	Commercial	Industrial	Non-Profit	Education	Gov.	Agriculture	Annualized Losses
Riverine Results								
Essex	$2	$2	$0	$0	$0	$0	$0	$4
Gloucester	$246	$37	$1	$5	$13	$14	$0	$316
King & Queen	$22	$0	$0	$0	$0	$0	$0	$22
King William	$455	$43	$8	$7	$0	$0	$1	$514
Mathews	$0	$0	$0	$0	$0	$0	$0	$0
Middlesex	$10	$0	$0	$0	$0	$0	$0	$10
Middle Peninsula Region	$735	$82	$9	$12	$13	$14	$1	$866
Coastal Results								
Essex	$1,807	$381	$49	$10	$15	$7	$0	$2,269
Gloucester	$16,325	$2,996	$262	$539	$1,375	$79	$38	$21,614
King & Queen	$1,069	$0	$45	$0	$0	$0	$0	$1,114
King William	$2,412	$676	$74	$158	$35	$402	$4	$3,761
Mathews	$7,268	$411	$131	$142	$13	$41	$28	$8,034
Middlesex	$2,287	$304	$14	$58	$4	$6	$0	$2,673
Middle Peninsula Region	$28,881	$4,464	$561	$849	$1,438	$529	$70	$36,792
Combined Riverine and Coastal Results								
Essex	$1,809	$383	$49	$10	$15	$7	$0	$2,273
Gloucester	$16,571	$3,033	$263	$544	$1,388	$93	$38	$21,930
King & Queen	$1,091	$0	$45	$0	$0	$0	$0	$1,136
King William	$2,867	$719	$82	$165	$35	$402	$5	$4,275
Mathews	$7,268	$411	$131	$142	$13	$41	$28	$8,034
Middlesex	$2,297	$304	$14	$58	$4	$6	$0	$2,683
Middle Peninsula Region	$31,903	$4,850	$584	$919	$1,455	$549	$71	$40,331
All values are in thousands of dollars								

Figures 41 through 48 on the following pages show the total annualized loss for the planning district and individual counties culminating in Figure 48 which categorizes the Total Annualized Losses by Top Ten ranking of Census blocks representing those areas throughout the Middle Peninsula Region that may require mitigation measures.

Figure 41:

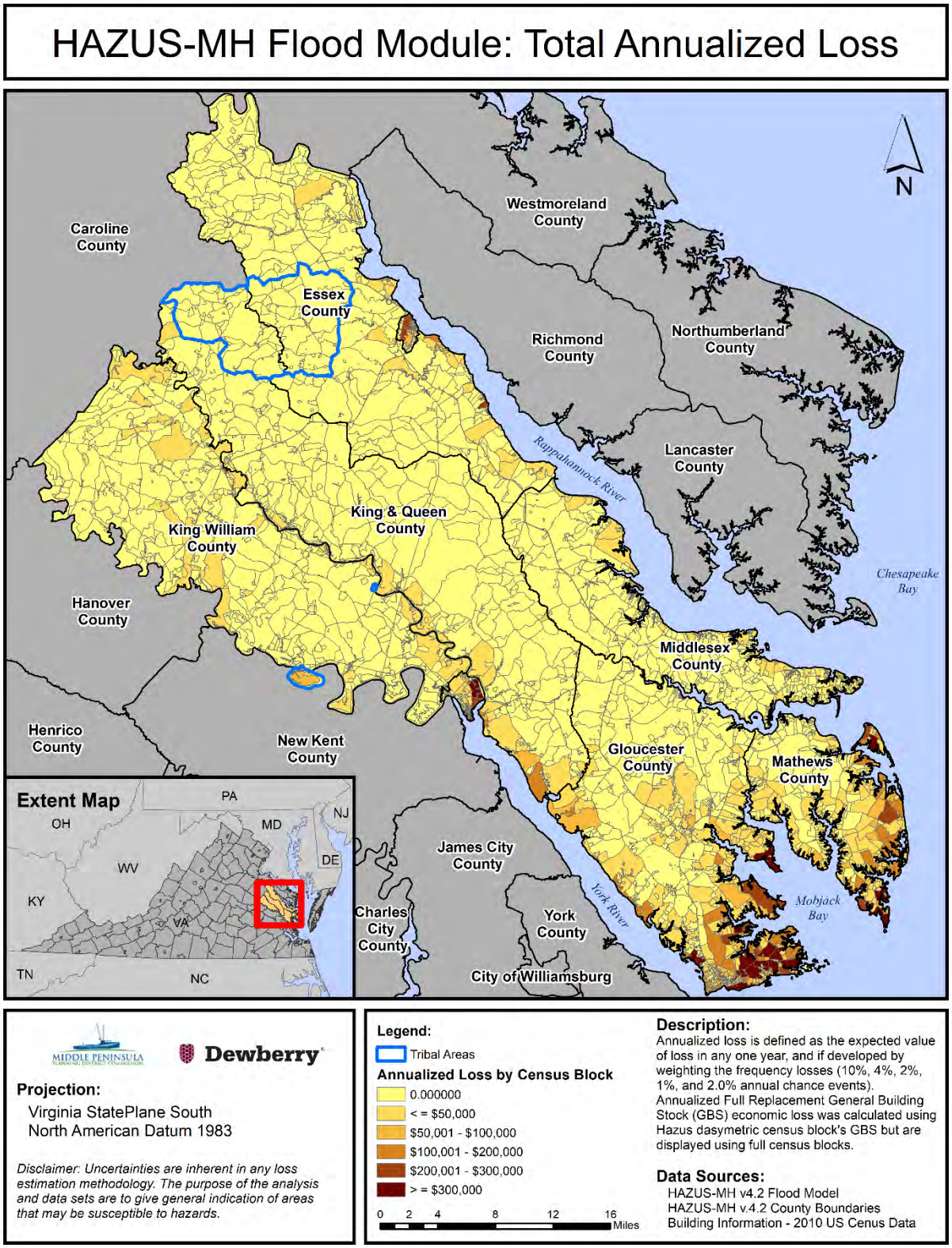

HAZUS-MH Flood Module: Total Annualized Loss
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York River
York County
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 2 4 8 12 16
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 42:

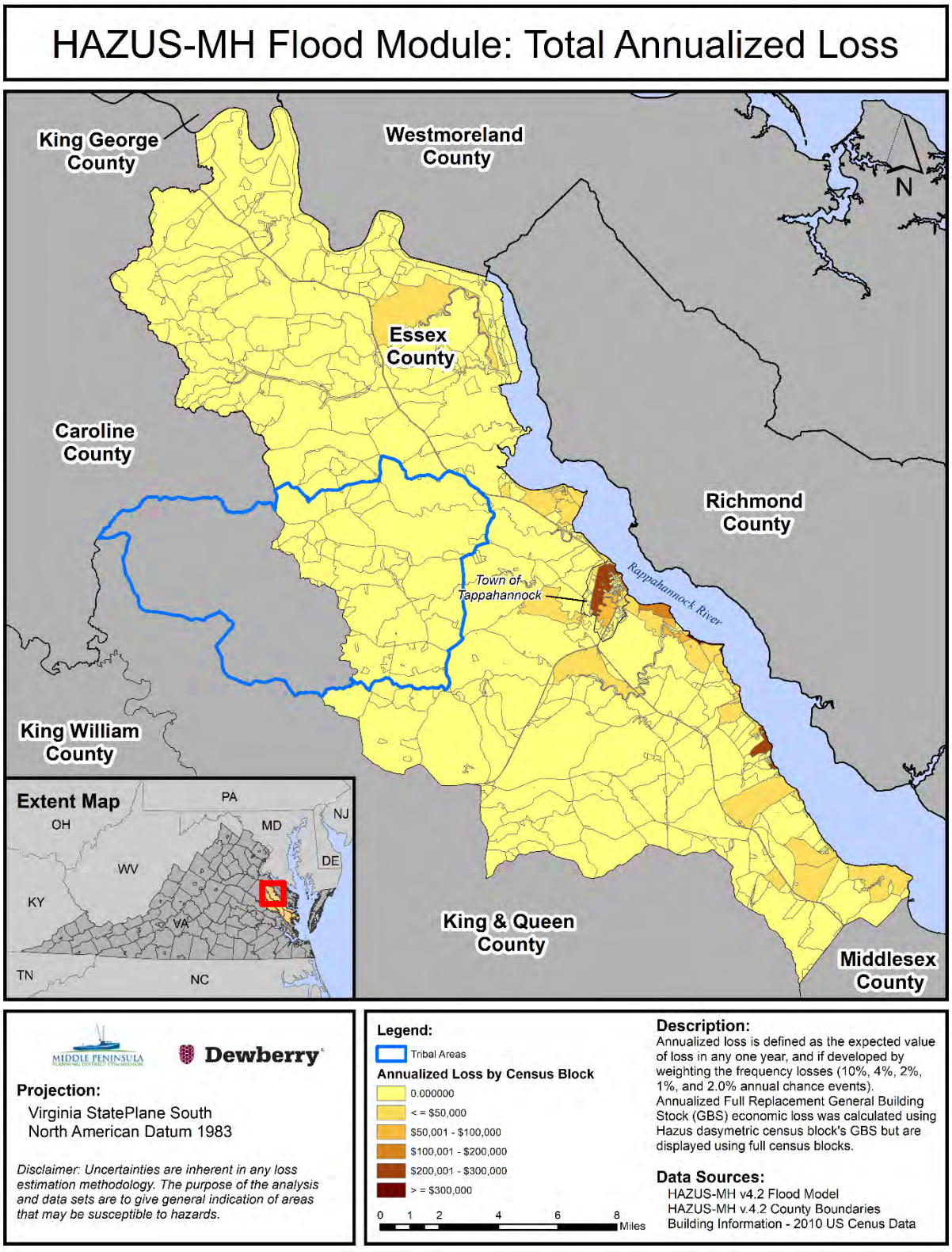

HAZUS-MH Flood Module: Total Annualized Loss
King George County
Westmoreland County
N
Essex County
Caroline County
Richmond County
Town of Tappahannock
Rappahannock River
King William County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
King & Queen County
Middlesex County
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 1 2 4 6 8
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 43:

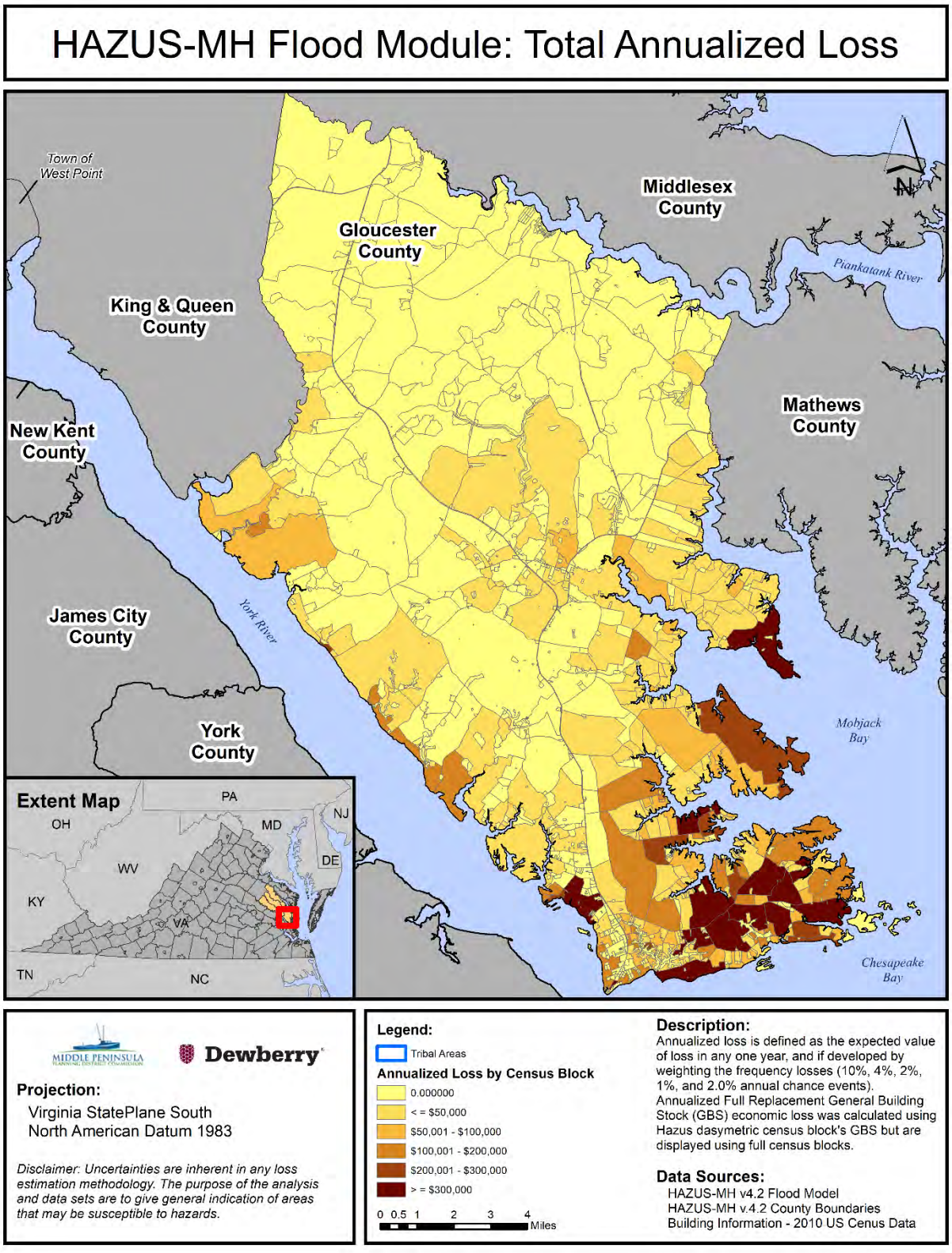

HAZUS-MH Flood Module: Total Annualized Loss
Town of West Point
Middlesex County
Gloucester County
Piankatank River
King & Queen County
Mathews County
New Kent County
James City County
York River
York County
Mobjack Bay
Chesapeake Bay
N
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 0.5 1 2 3 4
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 44:

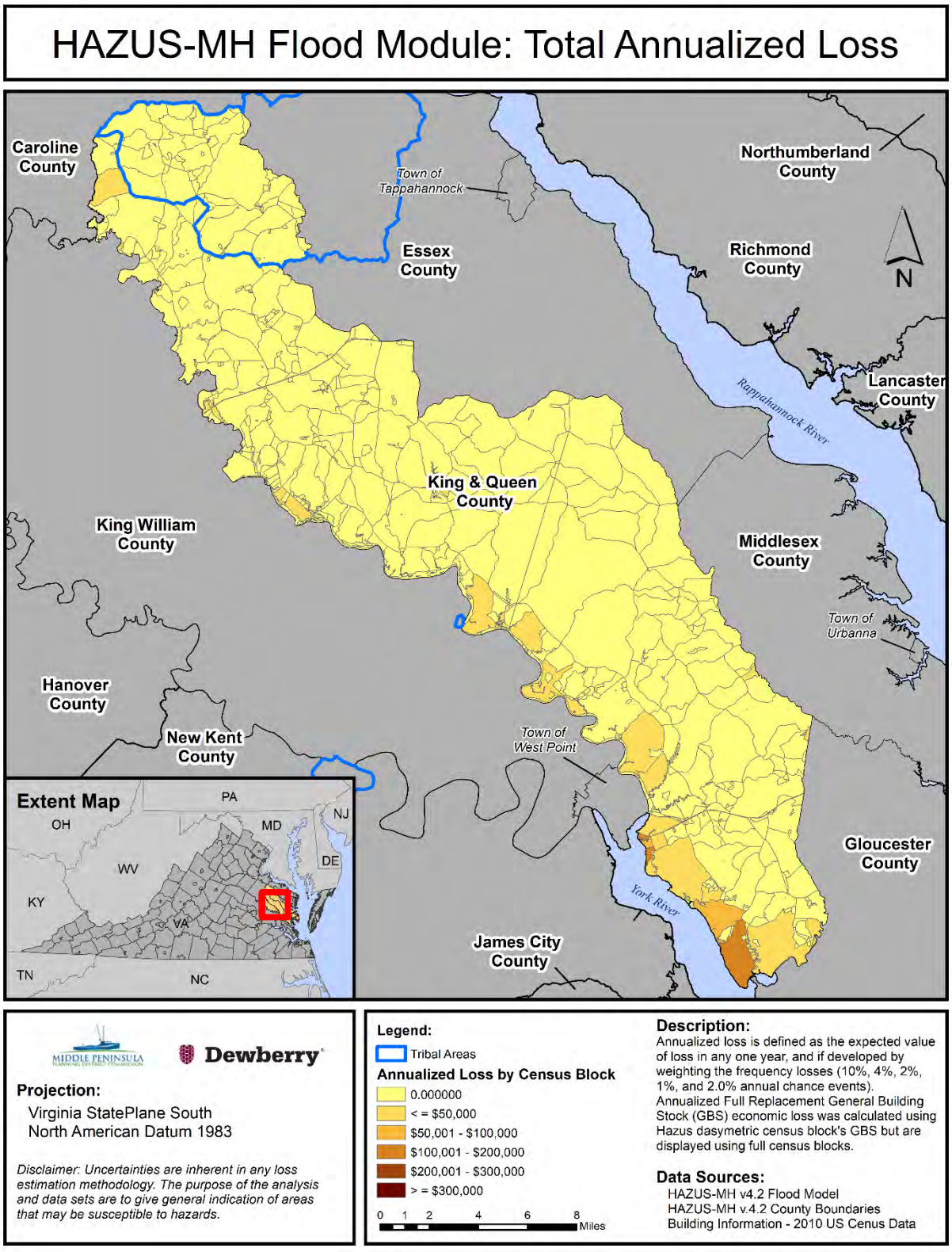

HAZUS-MH Flood Module: Total Annualized Loss
Caroline County
Town of Tappahannock
Essex County
Northumberland County
Richmond County
N
Rappahannock River
Lancaster County
King & Queen County
King William County
Middlesex County
Town of Urbanna
Hanover County
New Kent County
Town of West Point
Gloucester County
York River
James City County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 1 2 4 6 8
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 45:

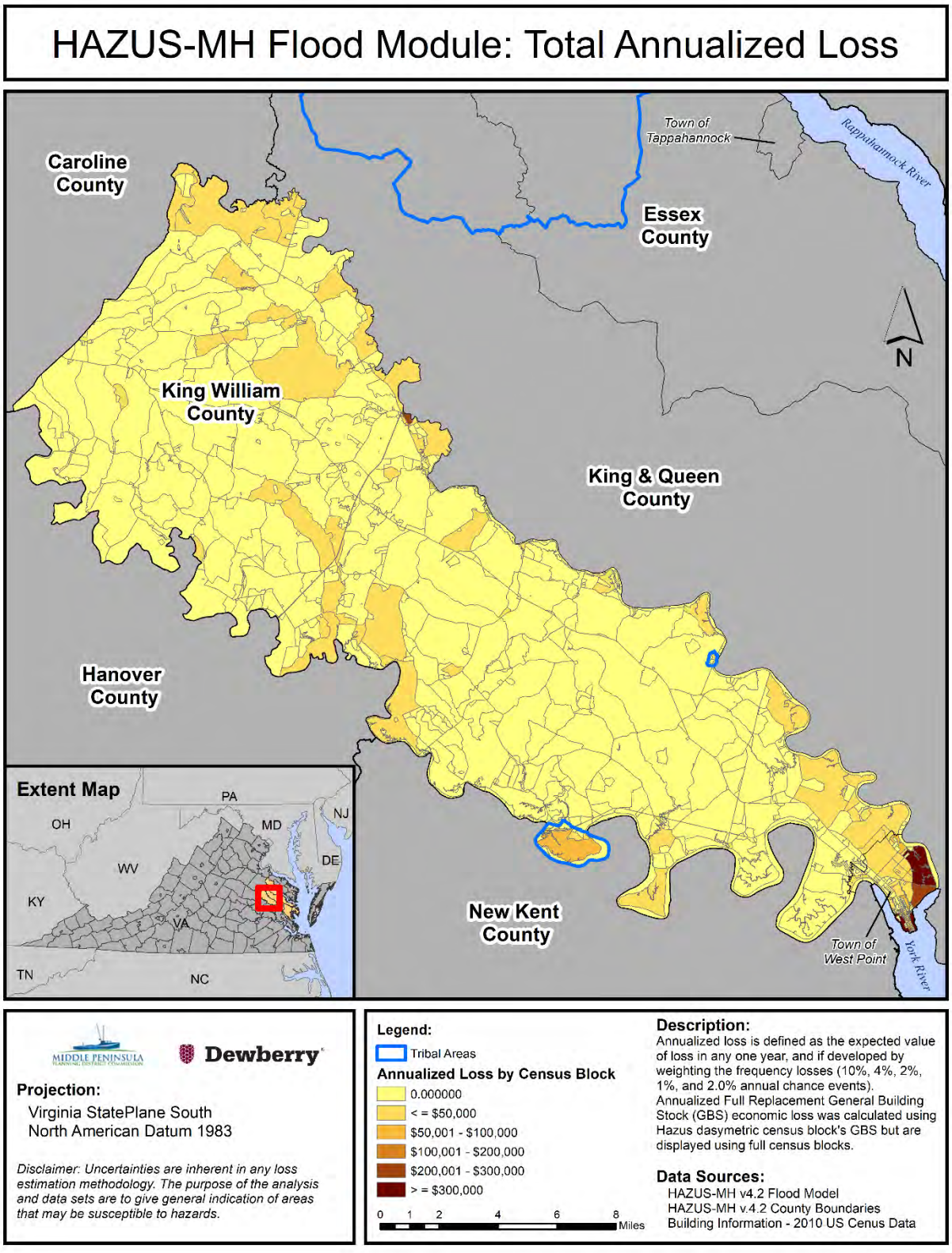

HAZUS-MH Flood Module: Total Annualized Loss
Caroline County
Town of Tappahannock
Rappahannock River
Essex County
N
King William County
King & Queen County
Hanover County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
New Kent County
Town of West Point
York River
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 1 2 4 6 8
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 46:

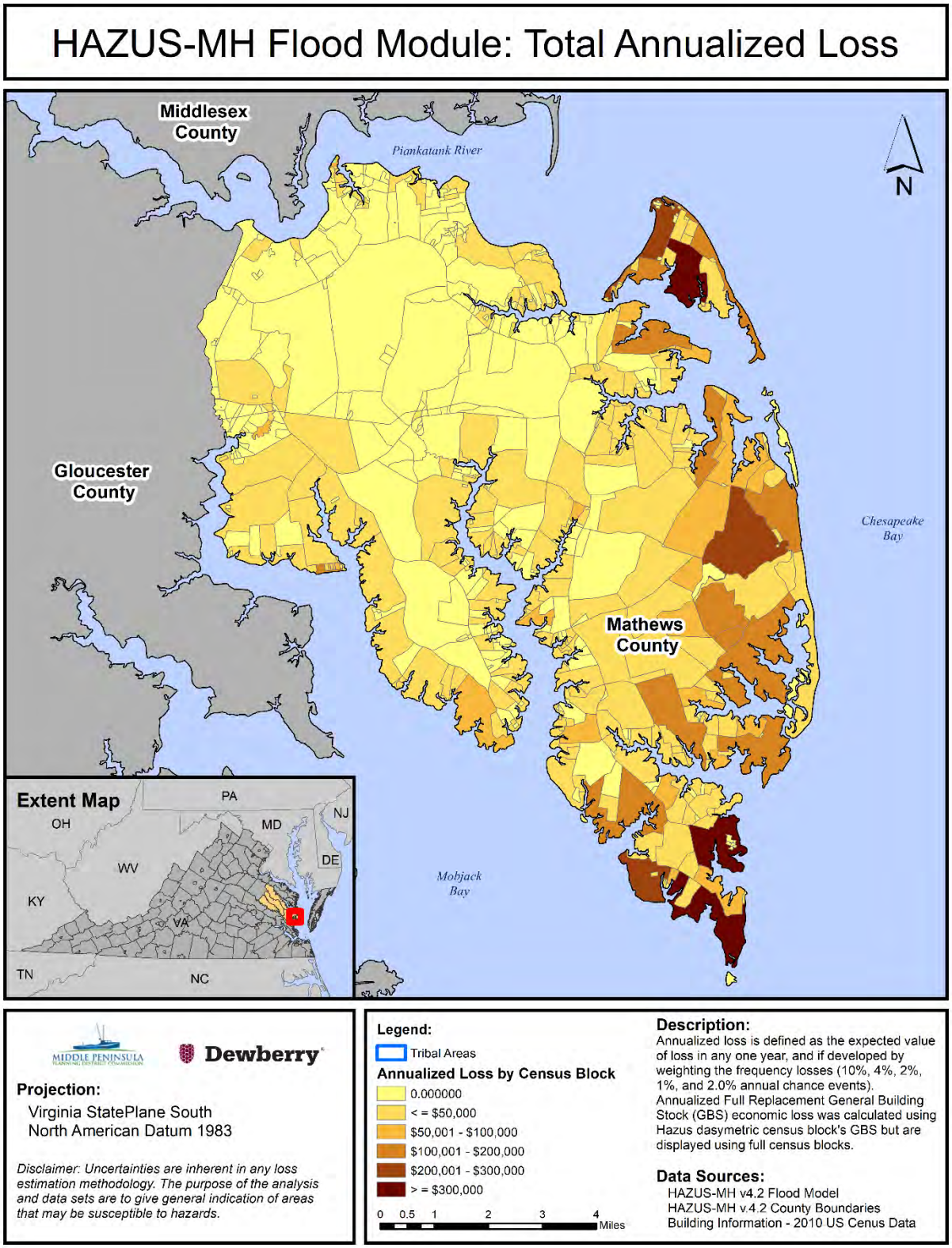

HAZUS-MH Flood Module: Total Annualized Loss
Middlesex County
Piankatank River
N
Gloucester County
Chesapeake Bay
Mathews County
Mobjack Bay
Extent Map
PA
OH
MD
NJ
WV
DE
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 0.5 1 2 3 4
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 47:

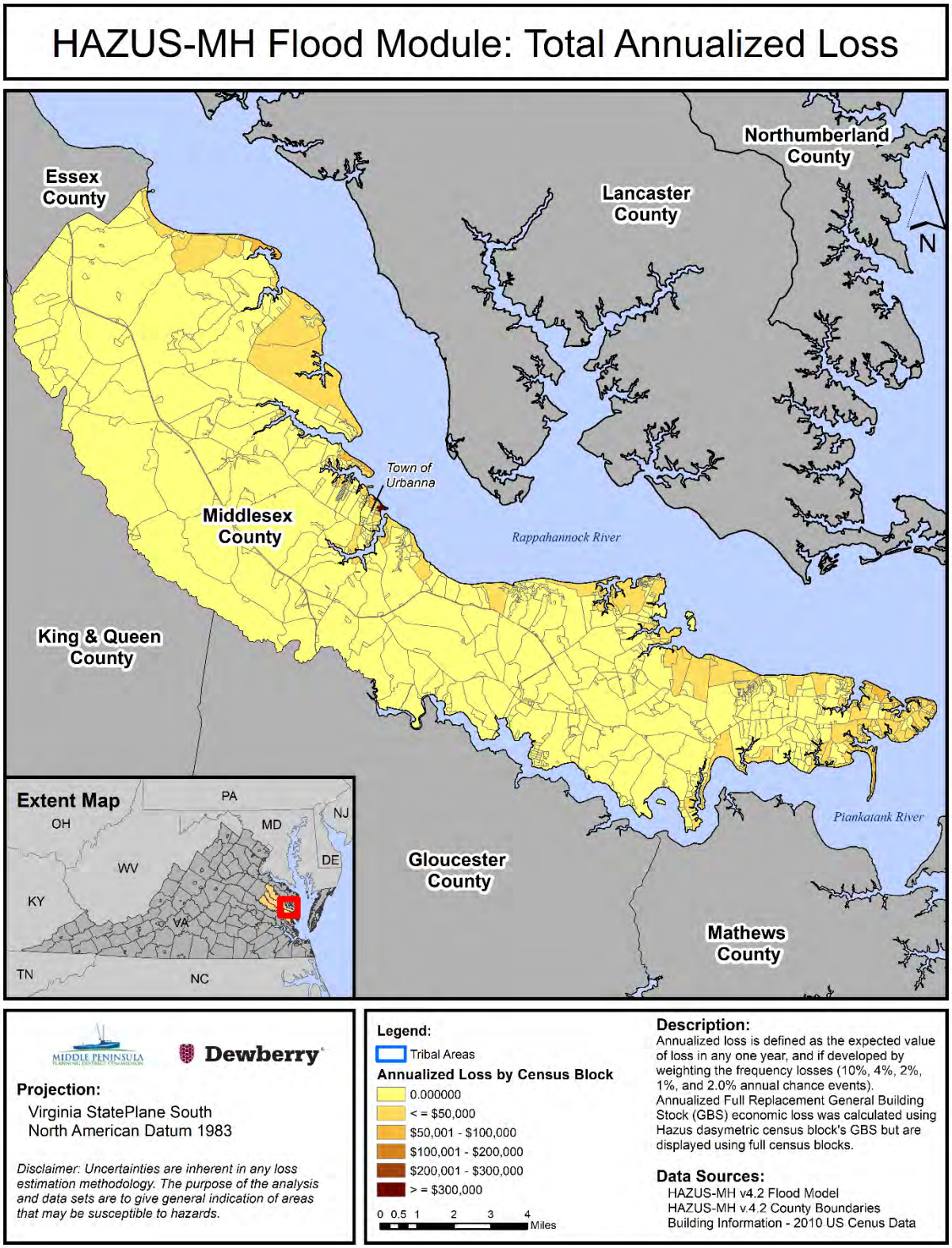
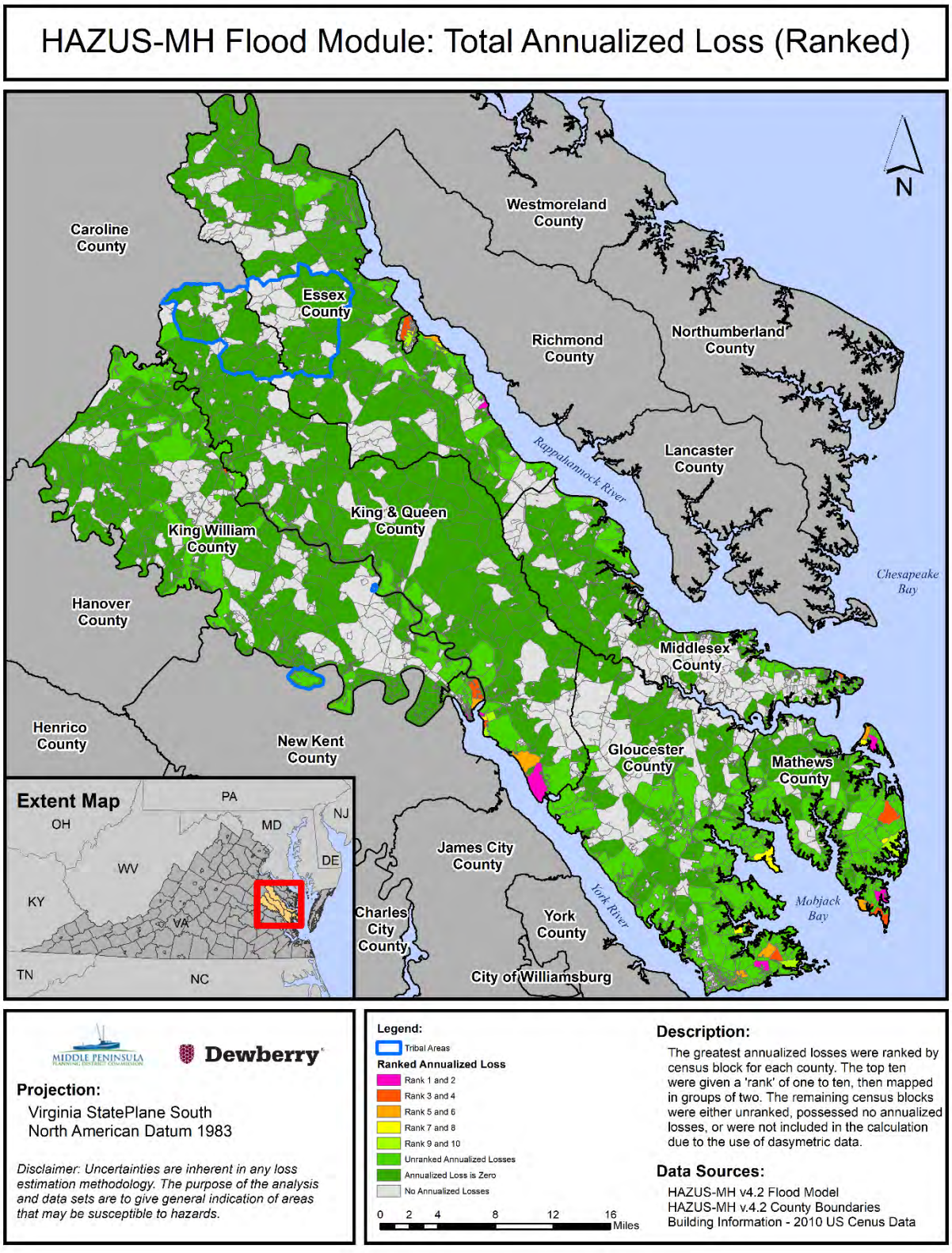

HAZUS-MH Flood Module: Total Annualized Loss
Essex County
Lancaster County
Northumberland County
N
Town of Urbanna
Middlesex County
Rappahannock River
King & Queen County
Extent Map
PA
OH
MD
NJ
WV
DE
KY
VA
TN
NC
Piankatank River
Gloucester County
Mathews County
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Annualized Loss by Census Block
0.000000
< = $50,000
$50,001 - $100,000
$100,001 - $200,000
$200,001 - $300,000
> = $300,000
0 0.5 1 2 3 4
Miles
Description:
Annualized loss is defined as the expected value of loss in any one year, and if developed by weighting the frequency losses (10%, 4%, 2%, 1%, and 2.0% annual chance events). Annualized Full Replacement General Building Stock (GBS) economic loss was calculated using Hazus dasymetric census block's GBS but are displayed using full census blocks.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 48:


HAZUS-MH Flood Module: Total Annualized Loss (Ranked)
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Ranked Annualized Loss
Rank 1 and 2
Rank 3 and 4
Rank 5 and 6
Rank 7 and 8
Rank 9 and 10
Unranked Annualized Losses
Annualized Loss is Zero
No Annualized Losses
0 2 4 8 12 16
Miles
Description:
The greatest annualized losses were ranked by census block for each county. The top ten were given a 'rank' of one to ten, then mapped in groups of two. The remaining census blocks were either unranked, possessed no annualized losses, or were not included in the calculation due to the use of dasymetric data.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Gloucester County accounts for about 54% of the planning district's combined riverine and coastal annualized losses. The census blocks bordering the York River and Mobjack Bay have higher loss values as compared to the larger census blocks in the northwest portions of the county. Combined damages along the York River are approximately half of the damages along Mobjack Bay. The southeast portion of the County contains the greatest concentration of loss. The vicinity of Guinea Road and Kings Creek Road; beginning in the locale of Hayes and heading east to Kings Creek being bordered on the north by the Severn River and on the south by the York River exhibits the greatest concentration of loss. Additionally, the land area of Saddlers Neck to Stump Point being bounded on the north by the Northwest Branch Severn River and Willetts Creek to the south exhibits a second concentration of risk. Finally, the peninsula and vicinity of Ware Neck Point -where the Ware River and North River converge – is another location exhibiting a concentration of losses.

Losses in Mathews County are spread throughout the county with a high frequency of census block having damages greater than $50,000 along the Chesapeake Bay to include the various harbor/haven inlets and also at the confluences of the Piankatank River in the north as well as Mobjack Bay in the south. Another location that exhibits relatively higher loss estimates includes Roys Point in the area around Daniel Avenue. Ultimately, Mathews County ranks second of the six counties and accounts for 20.1% of the total annualized losses in the Middle Peninsula planning district.

The census blocks bordering the Pamunkey and Mattaponi rivers contain almost all of the annualized damages for King William County with the greatest concentration of losses in the Town of West Point. Wood framed structures across the county account for more than 50% of the losses. The total annualized damages for the Town of West Point are approximately $3.5 million. Total annualized losses of the Pamunkey Indian Reservation are approximately $80,000 and the Mattaponi Indian Reservation is $12,000. One location in the northwestern portion of the County exhibits relatively higher annualized loss values; the area is in the vicinity of Aylett, with Aylett experiencing the losses near $352,000.

Middlesex County's annualized losses account for 6.8% of the total risk with wood framed structures accounting for about 67% of the losses. The census blocks along the Rappahannock River collectively account for the greatest amount of losses within the County. Losses in the vicinity of Mud Creek, Balls Point, the Town of Urbanna, and the confluence with the Chesapeake Bay constitute the areas having the highest loss values. The Town of Urbana has an estimated $745,000 in annualized damages and includes the census block having the highest estimated loss ($607,000) within the County. The second highest census block loss ($160,000) is located at the confluence between the Rappahannock River and the Chesapeake Bay in the southeastern portion of the County.

The majority of damage within Essex County is along the Rappahannock River with the greatest concentration of annualized losses from the Town of Tappahannock in the north, extending downstream to the vicinity of Bowlers Wharf. Total annualized damages along the length of the Rappahannock are approximately $2.28 million. The concentrated damages from Tappahannock to Wares Point is approximately $2.05 million or nearly 90% of the expected damages along the Rappahannock River. The Town of Tappahannock accounts for approximately $0.76 million or nearly one-third of the expected damages in the area of concentrated damages along the Rappahannock. The County and Town combined, account for approximately 5.6% of annualized damages for the Middle Peninsula region.

King and Queen County has the lowest annualized loss values for the region, accounting for 2.8% of the total damages. Residential occupancy makes up the majority of the losses in the county. A relatively small group of census blocks along the York River account for most of the damages near $1.03 million. In comparison, along the Mattaponi River damages are in the range of near $101,000 or roughly one-tenth of the expected damages along the York River. Notwithstanding, a small pocket of development at

the end of Limehouse Road along the Mattaponi River downstream of Muddy Point and opposite the Town of West Point is an area with annualized losses near $61,000. The Rappahannock Tribe's tribal designated statistical area (TDSA) has no calculated annual flood loss.

Table 52 lists the annualized flood losses for the Middle Peninsula Tribal Nations. Please note that the Upper Mattaponi is not represented in the below data but is included in the county data. GIS boundaries were sourced from the "American Indian/Alaska Native/Native Hawaiian Areas" as identified in the 2020 TIGER/Line GIS data, which is publicly available from the U.S. Census Bureau's website. (https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html). This website defines Reservation and TDSA areas as:

- *American Indian Reservations: The U.S. Census bureau's boundary files for American Indian reservations are areas with boundaries established by treaty, statute, and/or executive or court order. The reservations and their boundaries are identified for the Census Bureau by the Bureau of Indian Affairs (BIA), an agency in the U.S. Department of the Interior, or by State governments.*

- *Tribal Designated Statistical Areas[2]: the U.S. Census Bureau includes Tribal designated statistical areas that are geographic entities delineated by Federally and State-recognized tribes without a land base, that is, with no reservation or trust lands.* (https://www2.census.gov/geo/pdfs/reference/GARM/Ch5GARM.pdf):

It's important to note that upon correspondences with the Tribes this data does not accurately reflect Tribal lands. For instance, the Upper Mattaponi Indian Tribe is concerned with tribal land, land that citizens own, ancestral land, and land areas of Tribal interest, including but not limited to, traditional hunting and fishing areas, areas maintaining cultural significance, and all other ceded and non-ceded lands since the inception of the Tribe. The ancestral lands of Tsenacomacah encompassed the Tidewater and Eastern Shore regions, particularly the coastal and inland waterways in the York, James, and Rappahannock River watersheds. The Upper Mattaponi Indian Tribe is centered in King William County, with much of the tribal community base residing in ancestral lands. While the majority of tribal citizens live in Virginia, there are UMIT citizens in over thirty states.

For Tribal Nations shown in Table 52, all flood damage is from riverine sources.

Table 52: Tribal Nation based Hazus annualized losses.

Tribal Nation	Total Annualized Loss
Mattaponi Indian Reservation	$12,000 (13%)
Pamunkey Indian Reservation	$80,000 (87%)
Rappahannock Tribe's TDSA	No Losses
Total Tribal Losses	**$92,000**
To Note: *The Upper Mattaponi Indian Tribe was not included in the national HAZUS annualized losses database.*	

[2] Please note this TDSAs may not be the Tribe's planning area for the AHMP, land owned by the Tribe, land in trust to the Tribe, Tribal ancestral land, or land of importance to the Tribe. Future Hazus runs will need to improve and capture the Tribes planning area and assess the losses within these areas.

Essential Facilities and Loss Estimation

Hazus defines essential facilities as:

- Primary medical care facilities. Alternative care sites like nursing homes, outpatient, or urgent care sites are not included
- emergency operation centers
- public schools used for sheltering
- fire stations
- police stations

Schools are specifically those vital to emergency response and recovery following a disaster as they often play a key role in sheltering people displaced from damaged homes. Generally, the default Hazus data shows that there are very few locations of each type of essential facility in a census tract, making it easier to obtain site-specific information for each facility. Thus, damage and loss-of-function are evaluated on a building-by-building basis for this class of structure; even through the uncertainty in each such estimate is large[3]. To upgrade to a Level 2 analysis for essential facilities, each category of facility would be updated from local information. For a Level 2 analysis the key items to update are:

- Create a latitude/longitude for every building on a site (e.g. each school or hospital building). Normally smaller sheds such as yard maintenance or open sided structures such as pavilions are excluded.
- Capture the square footage, year built, unique name/id, and point of contact for all building locations being updated.
- Assign a building assessed replacement valuation to each essential facility. Often the assessor parcel information will only show a total for the improvements on a parcel so each building will need its own valuation
- Assign a first finished floor elevation to every building on the campus
- Gather contents information. Essential facilities like hospitals, fire stations and other emergency services may have very expensive equipment located on the first floor and are subject to content losses.
- For hospitals define the number of beds available.
- For schools and fire stations identify kitchens and available space for sheltering needs
- Define each of the building construction types. Schools often leverage portable buildings, manufactured facilities, or small metal outbuildings.
- Identify any flood wet or dry proofing that may have occurred at the building such as flood gates, elevation, or dry-lock for masonry construction types. Also note if generators are available and if they are elevated.

The Hazus essential facilities database includes default data for Medical Care Facilities, Emergency Response Facilities (fire stations, polices stations, emergency operation centers), and schools. Figure 49 displays the spatial location of the default essential facilities as provided with the Hazus software for the Plan.

Many Plans also identify critical facilities that are key to the functionality of a community. These often include water/wastewater services, key community functions, power facilities, road crossings/bridges, and other lifelines critical for restoration after a natural disaster. These individual facilities may be analyzed as a user defined feature (UDF) for flood damages. Unfortunately, the essential facilities module

[3] Multi-hazard Loss Estimation Methodology Hurricane Model User Manual, HAZUS-MH V4.2, Chapter 1: Introduction, 1-6

in Hazus does not incorporate an evaluation of restoration time, sheltering and lifeline outage and return to service functionality for other than its own essential facility categories.

The majority of the region's essential facilities are able to remain functional for the 10-percent-, 4-percent-, 2-percent-, 1-percent-, and 0.2-percent-annual-chance recurrence intervals. No facilities were damaged due to only riverine flood hazard. Only 6 essential facilities were calculated as damaged for the coastal flood hazard. Figure 50 highlights the locations of those facilities that are damaged by the Hazus Level 1 multi-frequency flood hazard(s) – thus experiencing estimated damage and loss. The previous Plan's results showed damages to West Point elementary, middle and high schools from coastal influenced flooding. This version of the Plan incorporated updated coastal modeling from FEMA, and these essential facilities showed no expected damages.

Table 53 lists the damaged essential facilities, the percent-annual-chance event that damaged the facility, it's building and contents losses, and the maximum time to full functionality.

Figure 49:

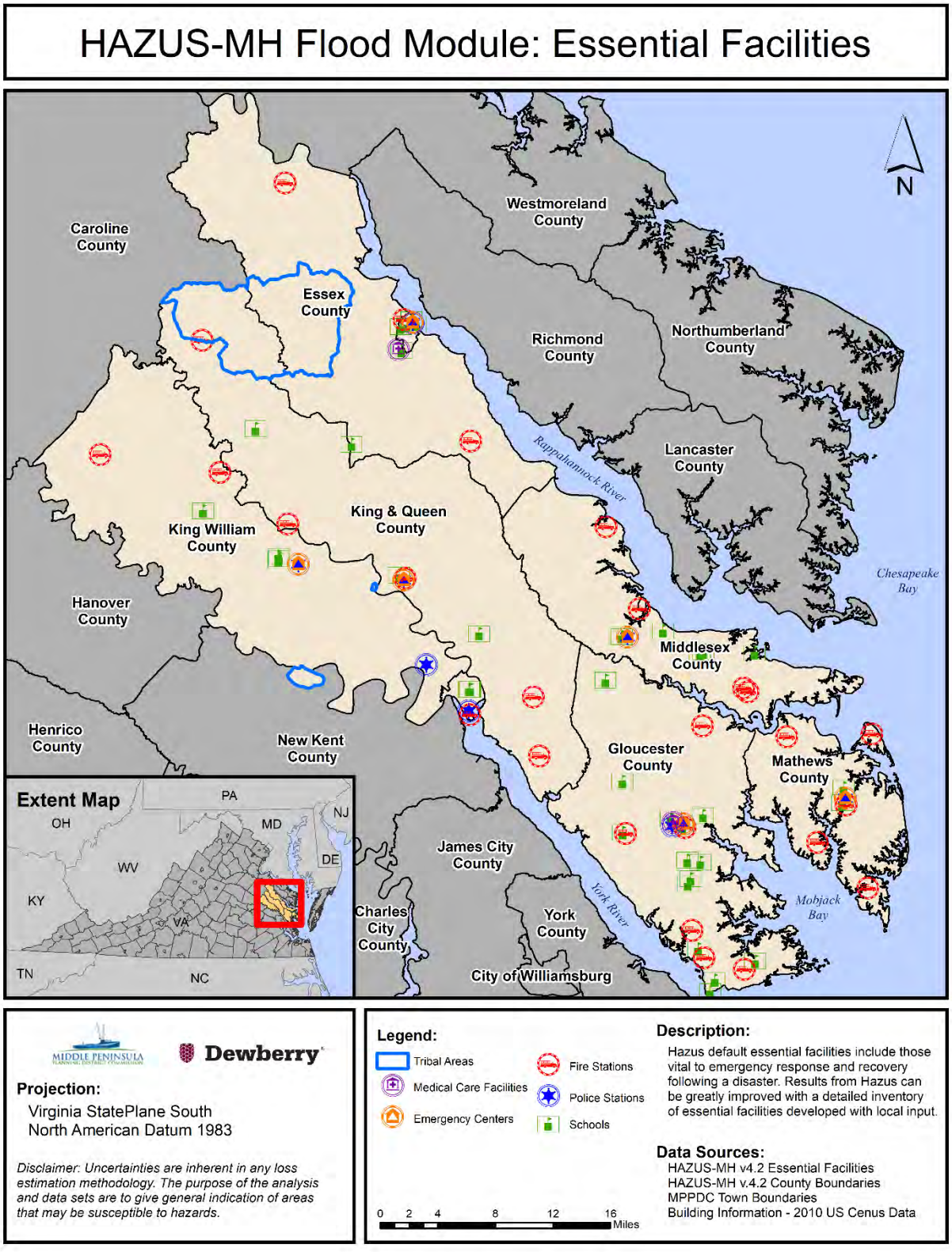
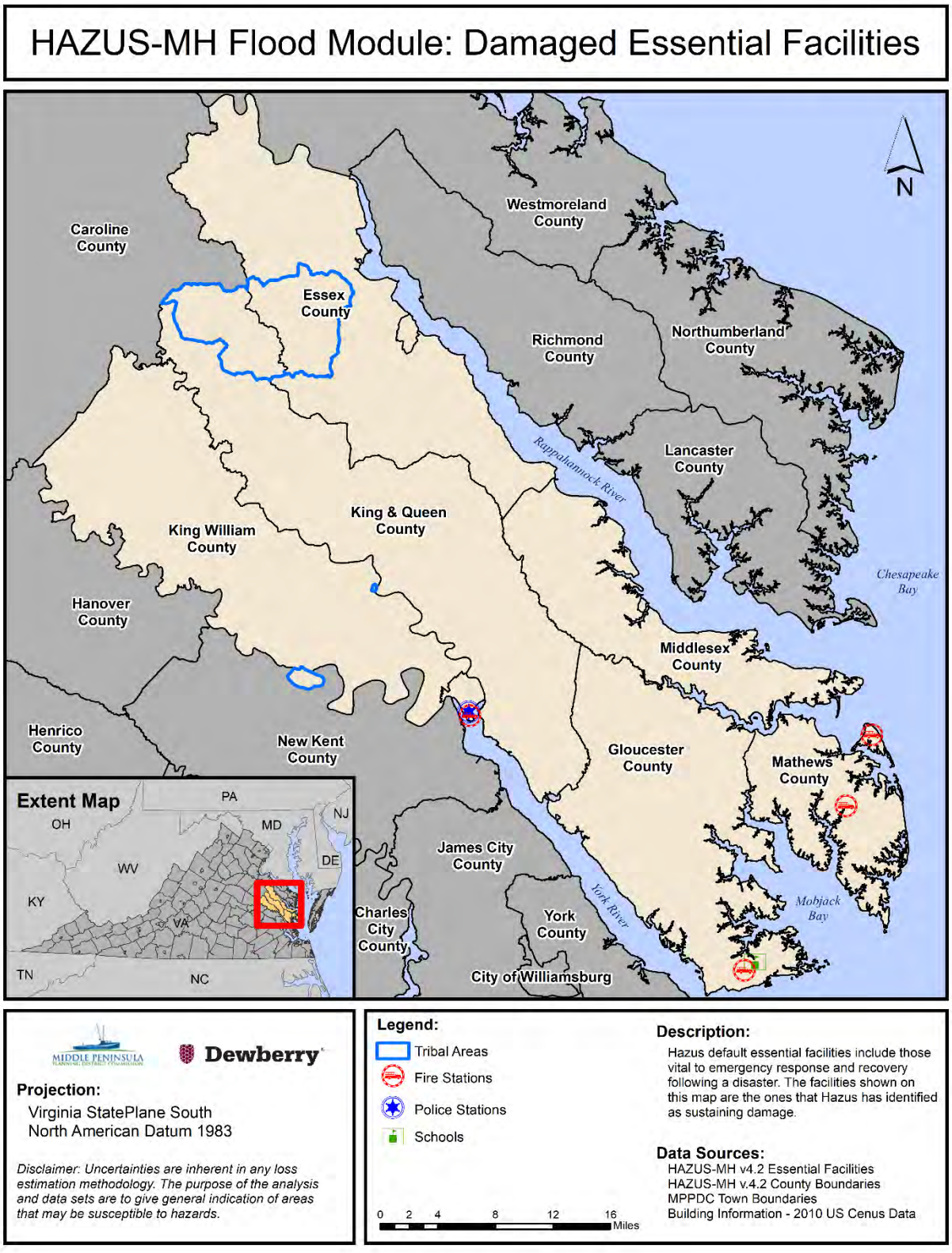

HAZUS-MH Flood Module: Essential Facilities
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King William County
King & Queen County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Medical Care Facilities
Emergency Centers
Fire Stations
Police Stations
Schools
0 2 4 8 12 16
Miles
Description:
Hazus default essential facilities include those vital to emergency response and recovery following a disaster. Results from Hazus can be greatly improved with a detailed inventory of essential facilities developed with local input.
Data Sources:
HAZUS-MH v4.2 Essential Facilities
HAZUS-MH v.4.2 County Boundaries
MPPDC Town Boundaries
Building Information - 2010 US Cenus Data

Table 53: Damages to essential facilities.

Name	City	Return Period	Flood Hazard	Building DmgPct	Building Losses	Contents DmgPct	Content Losses	Days to Full Restoration
Abingdon Volunteer Fire and Rescue Incorporated Station 2	Hayes	0.2-percent-annual-chance	Coastal	21.18%	$3,494	92.55%	$3,494	630
Achilles Elementary	Hayes	0.2-percent-annual-chance	Coastal	18.80%	$1,152	81.40%	$4,990	720
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	10-percent-annual-chance	Coastal	7.88%	$198	11.53%	$435	480
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	4-percent-annual-chance	Coastal	9.23%	$232	16.93%	$639	480
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	2-percent-annual-chance	Coastal	10.49%	$264	28.90%	$1,091	480
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	1-percent-annual-chance	Coastal	13.14%	$331	60.70%	$2,292	630
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	0.2-percent-annual-chance	Coastal	11.55%	$291	47.38%	$1,789	480
Mathews Volunteer Fire Department Incorporated Station 3	Gwynn	0.2-percent-annual-chance	Coastal	9.48%	$239	17.91%	$676	480
West Point Police Department	West Point	0.2-percent-annual-chance	Coastal	11.26%	$283	42.40%	$1,601	480
West Point Volunteer Fire Department / West Point Volunteer Rescue Squad	West Point	0.2-percent-annual-chance	Coastal	12.18%	$307	55.92%	$2,111	630

Note: No essential facilities had any calculated damage for the riverine flood hazard.

Figure 50:


HAZUS-MH Flood Module: Damaged Essential Facilities
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Chesapeake Bay
Hanover County
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Mobjack Bay
York River
Charles City County
York County
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Fire Stations
Police Stations
Schools
0 2 4 8 12 16
Miles
Description:
Hazus default essential facilities include those vital to emergency response and recovery following a disaster. The facilities shown on this map are the ones that Hazus has identified as sustaining damage.
Data Sources:
HAZUS-MH v4.2 Essential Facilities
HAZUS-MH v.4.2 County Boundaries
MPPDC Town Boundaries
Building Information - 2010 US Census Data

Comparative Flood Modeling and Comparative Hot Spot Maps

The previous version of this plan included a section to compare the potential results of a Hazus generated depth of flooding product (Level 1) to the results of a Level 2 analysis that included engineering study of flood hazards converted to depth grids to that closely aligned with FEMA's special flood hazard area. This previous comparison made the case for the use of a Level 1 analysis as the best available data. This comparative analysis was not created for this version as the Plan as the flood hazard data was updated with all available FEMA flood study data from engineering riverine and coastal modeling sources, where it was available. The incorporation of engineering supported depth grids creates a Level 2 Hazus scenario representing the best available data used to estimate riverine and coastal flood damages.

Additional analysis was also completed in the previous Plan to compare the essential facilities that were damaged to an overlay of the essential facilities with FEMA's flood hazard mapping to identify hot spots. As the flooding depth grids in this version of the plan are directly created form FEMA's flood hazard mapping product, the comparison of the Level 1 Hazus damages to Level 2 FEMA flood hazard areas is not needed. The damages to the essential facilities should now be consistent with FEMA's flood hazard areas.

Potential Mitigation Actions

The potential mitigation actions noted are those that are Hazus-specific and would benefit refinement of Hazus analyses. The previous Plan update included the following items (below). Those items that have been accomplished in the current Plan update are symbolized with a check-mark (☑) and those that still remain for future efforts (☐). New potential Hazus Mitigation actions are denoted with the following (➢).

- ☐ Update flood risk to have improved multi-frequency riverine depth grids over the remaining areas of Middle Peninsula.
- ☐ Update flood risk to have accurate multi-frequency coastal depth grids over all areas of Middle Peninsula.
- ☐ Once multi-frequency depth grids have been created for both riverine and coastal flooding across all areas of Middle Peninsula, re-run Hazus for to update this plan with the 2020 census data.
- ☐ Level 2 general building stock and essential facilities improvements.
    - o Improvements in the future should aim to further refine the building stock. Notably, one improvement should include adding new development that may not have been in the land use/land cover data; e.g., new housing developments, new construction, etc.
    - o Perform localized building-level assessments in known areas of loss and or areas subject to likely losses.
- ☐ Improve Data associated with the federally recognized tribes.

Hurricane Wind Analysis

The hurricane wind model uses state of the art wind field models, and calibrated and validated hurricane data. Wind speed has been calculated as a function of central pressure, translation speed, and surface roughness as described in the Hazus Wind Model Technical Manual as:

- Central pressure is modeled as a function of sea surface temperature, and the storm heading, speed, etc., are updated at each six-hour point in the storm history. Linear interpolation is used between the six-hour points;
- Translation speed is modeled as the forward speed of the storm with winds in the right front quadrant as the strongest due to additive nature of the wind (forward speed + hurricane induced wind speed). Typically, as well, this has the least amount of surface friction to reduce the wind speed, since it is generally more of water
- Surface roughness is modeled as the friction of the earth's surface that would reduce wind speed. For example, land, buildings and trees create drag on the wind versus just open water which has the lowest friction.

This assessment has been completed for Probabilistic Level 1 analysis for the Hurricane wind hazard. The standard methodology of defining loss potential for any given hazard, includes annualizing the potential over a series of statistical return periods. Annualization is the mathematical method of converting individual losses to a weighted-average that may be experienced in any given year. The standard probabilistic scope pertaining to Hazus Level 1 hurricane wind risk corresponds to annualizing the 0.1%, 0.2%, 0.5%, 1%, 2%, 5%, and 10% wind return periods. These same annual-chance return periods are often described as the 1,000-year, 500-year, 200-year, 100-year, 50-year, 20-year and 10-year events as shown in Table 54 below. As this is a probabilistic analysis, the hurricane that is simulated does not represent an actual, historic hurricane tract or path. This is a simulation for the study area of a hurricane with common parameters derived from multiple historic events along with industry standardized modeling for scenarios.

Table 54: Annual probability based on wind recurrence intervals.

Wind Recurrence Interval	Annual Chance of Occurrence
10-year	10.0%
20-year	5.0%
50-year	2.0%
100-year	1.0%
200-year	0.5%
500-year	0.2%
1000-year	0.1%

Practically, these statistical events represent the chance of being equaled or exceeded in any given year; i.e., the likelihood that a particular event with a given intensity occurs on average at least once every x-

years. Once each of these statistical return periods are calculated, an annualized value is computed thus offering a perspective for any given year. For this analysis, it is the annual chance of occurrence that is used to describe a given recurrence event.

In addition to the Level 1 probabilistic methodology for development of the wind event, a Level 1 analysis is performed on the default economic building stock data and the default essential facilities data provided with the Hazus software; i.e., no local data inputs. For a Level 1 analysis, dollar values shown in this report should only be used to represent cost of damage for large aggregations of building types. Highly detailed, building specific, loss estimations have not been completed for this analysis as they require additional local data inputs. To perform a Level 2 analysis of the economic building stock would involve replacing the default information with property replacement values provided from each county's tax assessor data and supplemented with property valuations from property not in the assessor's system (such as government facilities that are not included in local tax assessment data). In addition, the essential facilities such as emergency operation centers, policy stations, fire stations, school campus buildings, and hospital campus sites would be updated to include not only replacement value but also content valuations. Updating the economic inventory involves cooperation with all partners to the plan and often needs redaction of any data with privacy concerns. For the Level 2 environment revised assumptions also need to be developed for the building structure design, approximate finished floor elevation heights, and any wet or dry flood-proofing or wind mitigation that may have been added to the improvement on a property. Updating the building inventory for a Level 2 environment provides the benefit of better and more relevant data to the local region, but the creation of these data also requires pre-coordination with all potential data contributors to the project. Ideally a Level 2 building inventory update would be conducted prior to the kickoff of a plan's update cycle to allow for more time to collect and process data from all jurisdictions participating in the plan.

Note that combined wind, storm surge and wave-type scenarios have not been implemented in this Plan update however, the Flood modeling includes various scenarios that include the effects of storm surge and wave-action. Storm surge risk and coastal flooding is discussed in Section 4.

Loss estimation for this Hazus module is based on specific input data. The inputs include square footage of buildings for specified structural or occupancy types and information on the local economy that is used in estimating losses. Table 55 displays the economic loss categories used to calculate annualized losses by Hazus.

Table 55: Hazus direct economic loss categories and descriptions.

Category Name	Description of Data Input into Model	Hazus Output
Building	Cost per square foot to repair damage by structural type and occupancy for each level of damage	Cost of building repair or replacement of damaged and destroyed buildings
Contents	Replacement value by occupancy	Cost of damage to building contents
Inventory	Annual gross sales in dollars per square foot	Loss of building inventory as contents related to business activities
Relocation	Multiple factors; primarily a function of Rental Costs ($/ft2/month) for non-entertainment buildings where damage ≥10%	Relocation expenses (for businesses and institutions); disruption costs to building owners for temporary space.
Income	Income in dollars per square foot per month by occupancy	Capital-related incomes losses as a measure of the loss of productivity, services, or sales
Rental	Rental costs per month per square foot by occupancy	Loss of rental income to building owners
Wage	Wages in $ per sq ft per month by occupancy	Employee wage loss as described in income loss

A probabilistic scenario Hazus analysis was completed using the planning district as the study area. The individual county results have been derived from this data set.

The Middle Peninsula region currently has approximately 45,683 structures with an estimated exposure value of approximately $12.5 Billion. Average estimated replacement value of buildings in the study area range from $205,000 to $312,000, with the mean approximation value of $273,000 [4]. Ninety-four percent of the planning district's general occupancy is categorized as residential, followed by commercial (4%). The remaining two percent is a combination of industrial, agriculture, religion, government, and education buildings. Table 56 provides inventory information for each of the six counties that were included in the analysis. Gloucester County occupies a large percentage (40%) of the building stock exposure for the region.

[4] Previous Plan values adjusted per BLS CPI Inflation Calculator (2000 to 2010) to match Hazus/Census years.

Table 56: Building stock exposure for general occupancies by county.

County	Residential	Commercial	Industrial	Agriculture	Religion	Govt.	Education	Total $ and % of Total
Essex	$1,690,695	$404,683	$149,121	$21,320	$38,252	$20,307	$36,124	$2,360,502 (12%)
Gloucester	$6,468,784	$879,665	$164,938	$28,290	$116,120	$36,529	$196,149	$7,890,475 (40%)
King & Queen	$992,231	$57,304	$30,890	$5,828	$27,490	$3,346	$8,736	$1,125,825 (6%)
King William	$2,799,158	$294,544	$118,245	$28,276	$57,502	$27,319	$29,734	$3,354,778 (17%)
Mathews	$1,739,804	$159,583	$50,753	$8,584	$27,408	$7,692	$14,446	$2,008,270 (10%)
Middlesex	$2,431,988	$379,226	$69,110	$12,200	$36,784	$13,212	$48,482	$2,991,002 (15%)
Total	**$16,122,660**	**$2,175,005**	**$583,057**	**$104,498**	**$303,556**	**$108,405**	**$333,671**	**$19,730,852**
% of Total	82%	11%	3%	< 1%	2%	< 1%	2%	100%
All values are in thousands of dollars								

Building stock exposure is also classified by building type. General Building Types (GBTs) have been developed as a means to classify the different building types. This provides an ability to differentiate between buildings with substantially different damage and loss characteristics. Model building types represent the average characteristics of buildings in a class. The damage and loss prediction models are developed for model building types and the estimated performance is based upon the "average characteristics" of the total population of buildings within each class. Five general classifications have been established, including wood, masonry, concrete, steel and manufactured homes (MH). A brief description of the building types is available in Table 57.

Table 57: Hazus general building type classes.

General Building Type	Description
Wood	Wood frame construction
Masonry	Reinforced or unreinforced masonry construction
Steel	Steel frame construction
Concrete	Cast-in-place or pre-cast reinforced concrete construction
MH	Factory-built residential construction

Buildings with wood construction represents the majority (74%) of building types in the planning district and align predominantly with residential building practices. Masonry construction accounts for almost a quarter of the building type exposure and is primarily for non-residential buildings. Table 58 provides building stock exposure for the five main building types.

Table 58: Building stock exposure for general building type by county.

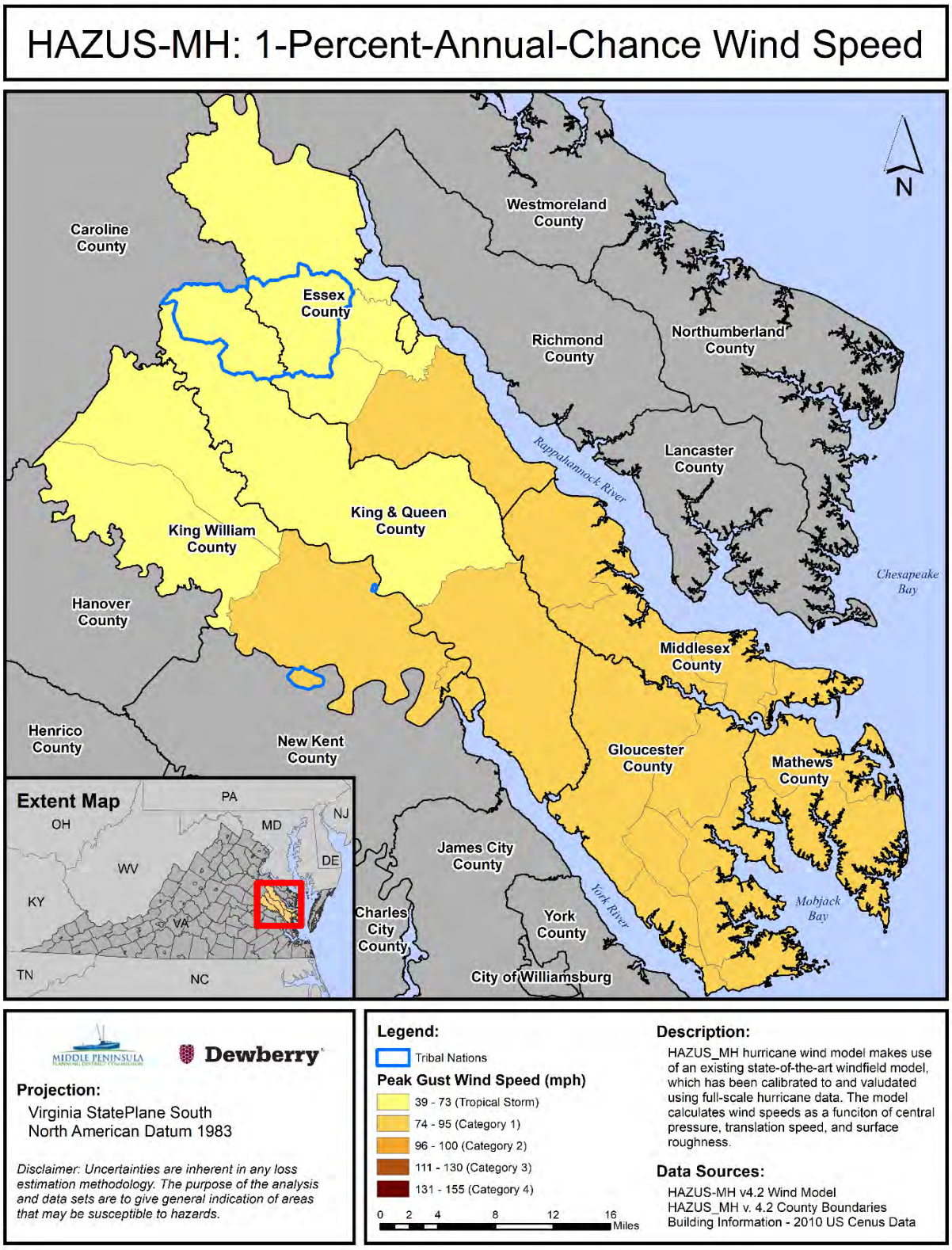
County	Wood	Masonry	Concrete	Steel	Manufactured Home	Total
Essex	$739,917	$277,995	$12,384	$54,013	$41,811	$1,126,120
Gloucester	$4,926,253	$2,004,985	$184,550	$629,434	$145,376	$7,890,598
King & Queen	$1,296,670	$500,835	$34,312	$122,743	$53,977	$2,008,537
King William	$2,152,946	$851,390	$65,898	$244,516	$40,194	$3,354,944
Mathews	$1,289,067	$592,340	$101,638	$323,107	$54,516	$2,360,668
Middlesex	$1,845,893	$762,017	$70,862	$242,371	$70,147	$2,991,290
Total	**$12,250,746**	**$4,989,562**	**$469,644**	**$1,616,184**	**$406,021**	**$19,732,157**
% of Total	62%	25%	3%	8%	2%	100%
All values are in thousands of dollars						

Multi-frequency Hurricane Modeling – Probabilistic Level 1 methodology
Annualized loss is defined as the expected value of loss in any one year and is developed by aggregating the losses and exceedance probabilities for the 10-percent-, 5-percent-, 1-percent-, 0.5-percent-, 0.2-percent-, and 0.1-percent-annual-chance return periods. The following figures illustrate the 3-second peak gust wind speeds for the 1-percent-, 0.2-percent-, and 0.1-percent-annual-chance return periods. Wind speeds are based on estimated 3-second gusts in open terrain at 10 meters above the ground at the centroid of each census track. Buildings that must be designed for a 1-percent-annual-chance mean recurrence interval wind event include[5]:

- Buildings where more than 300 people congregate in one area
- Buildings that will be used for hurricane or other emergency shelter
- Buildings housing a day care center with capacity greater than 150 occupants
- Buildings designed for emergency preparedness, communication, or emergency operation center or response
- Buildings housing critical national defense functions
- Buildings containing sufficient quantities of hazardous materials

[5] Whole Building Design Guide (WBDG) Wind Safety of the Building Envelop by Tom Smith 5/26/2008

Figure 51:


HAZUS-MH: 1-Percent-Annual-Chance Wind Speed
N
Caroline County
Essex County
Westmoreland County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King William County
King & Queen County
Chesapeake Bay
Hanover County
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
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Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Peak Gust Wind Speed (mph)
39 - 73 (Tropical Storm)
74 - 95 (Category 1)
96 - 100 (Category 2)
111 - 130 (Category 3)
131 - 155 (Category 4)
0 2 4 8 12 16
Miles
Description:
HAZUS_MH hurricane wind model makes use of an existing state-of-the-art windfield model, which has been calibrated to and valudated using full-scale hurricane data. The model calculates wind speeds as a funciton of central pressure, translation speed, and surface roughness.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS_MH v. 4.2 County Boundaries
Building Information - 2010 US Cenus Data

Figure 52:

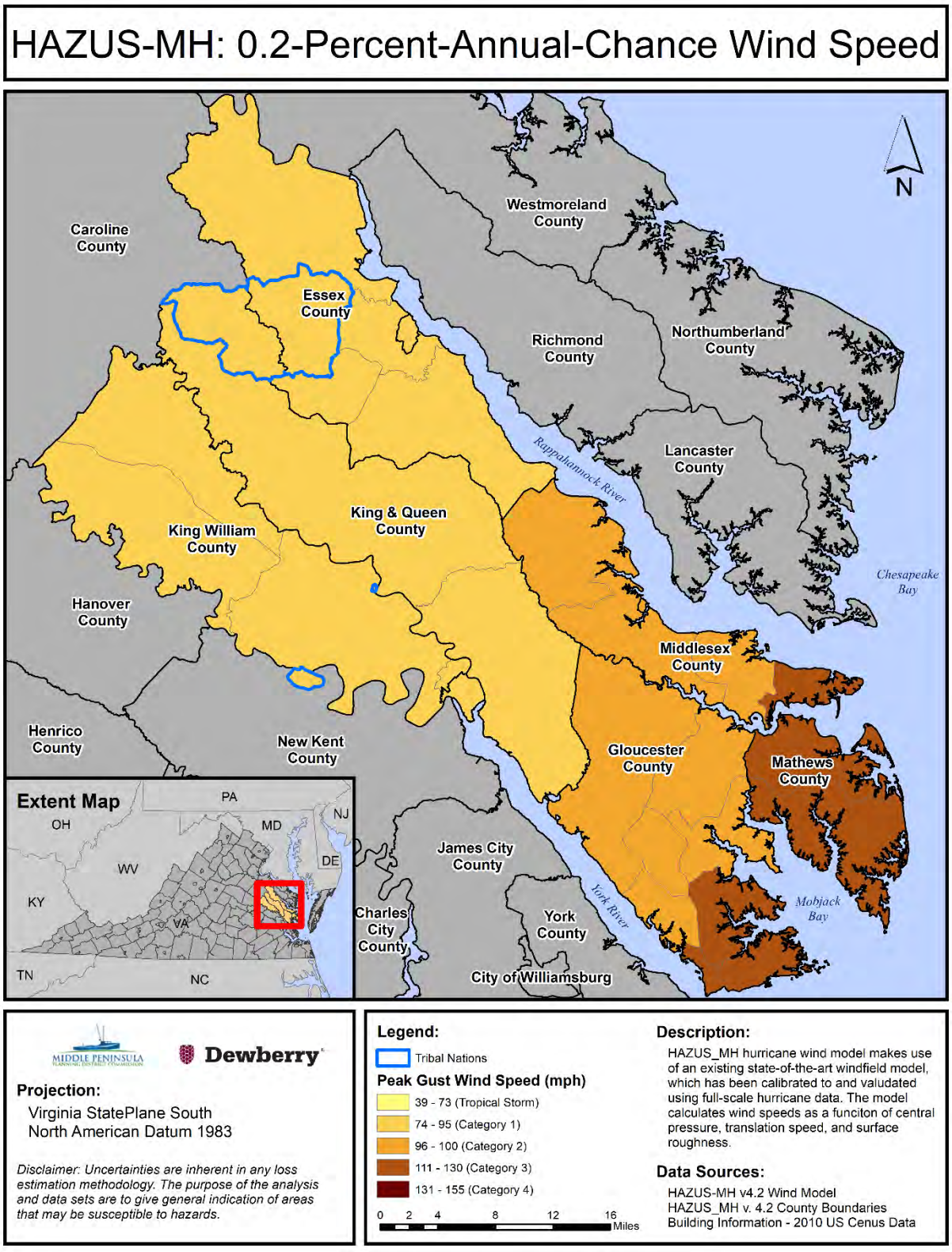
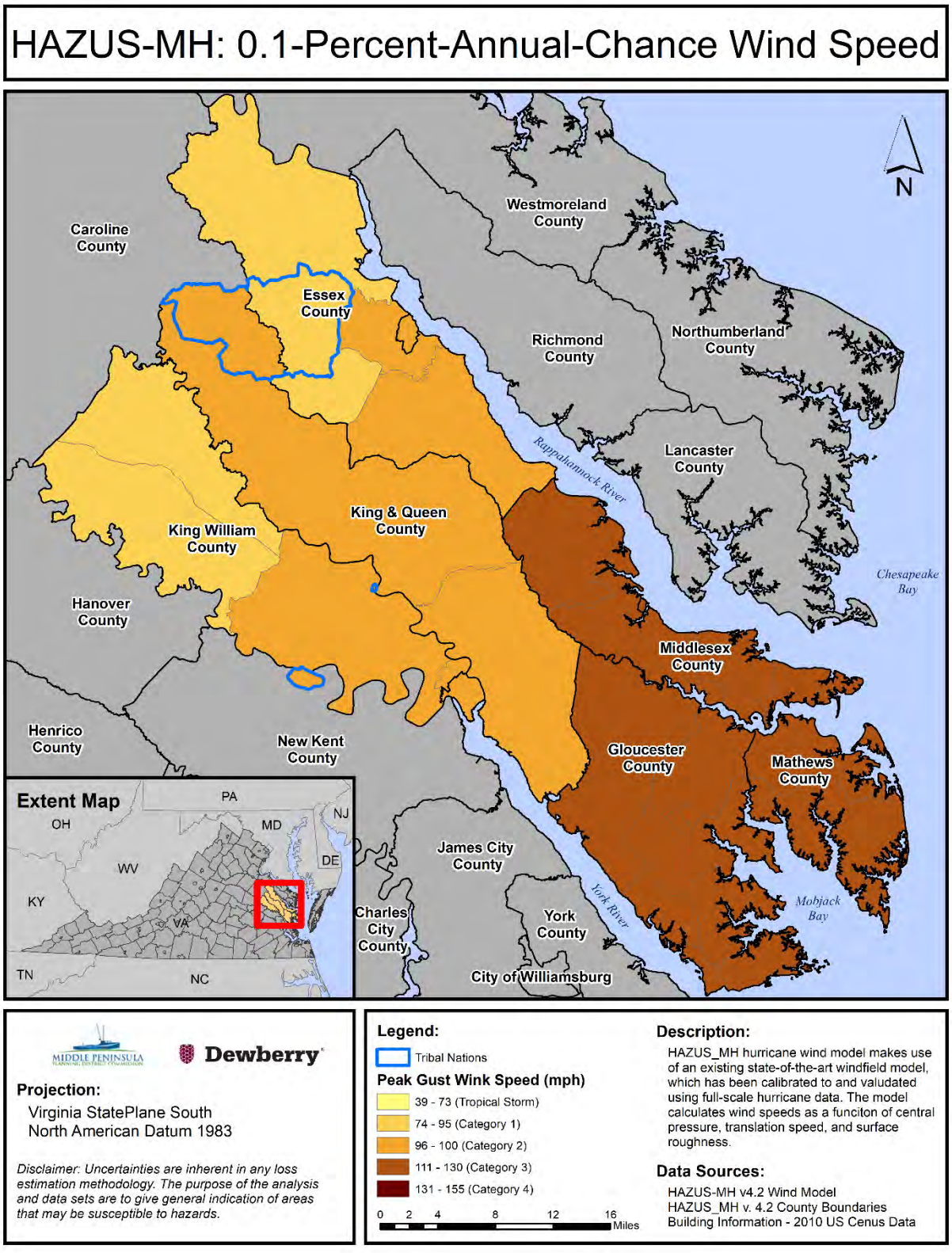

HAZUS-MH: 0.2-Percent-Annual-Chance Wind Speed
N
Caroline County
Essex County
Westmoreland County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King William County
King & Queen County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Peak Gust Wind Speed (mph)
39 - 73 (Tropical Storm)
74 - 95 (Category 1)
96 - 100 (Category 2)
111 - 130 (Category 3)
131 - 155 (Category 4)
0 2 4 8 12 16
Miles
Description:
HAZUS_MH hurricane wind model makes use of an existing state-of-the-art windfield model, which has been calibrated to and valudated using full-scale hurricane data. The model calculates wind speeds as a funciton of central pressure, translation speed, and surface roughness.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS_MH v. 4.2 County Boundaries
Building Information - 2010 US Cenus Data

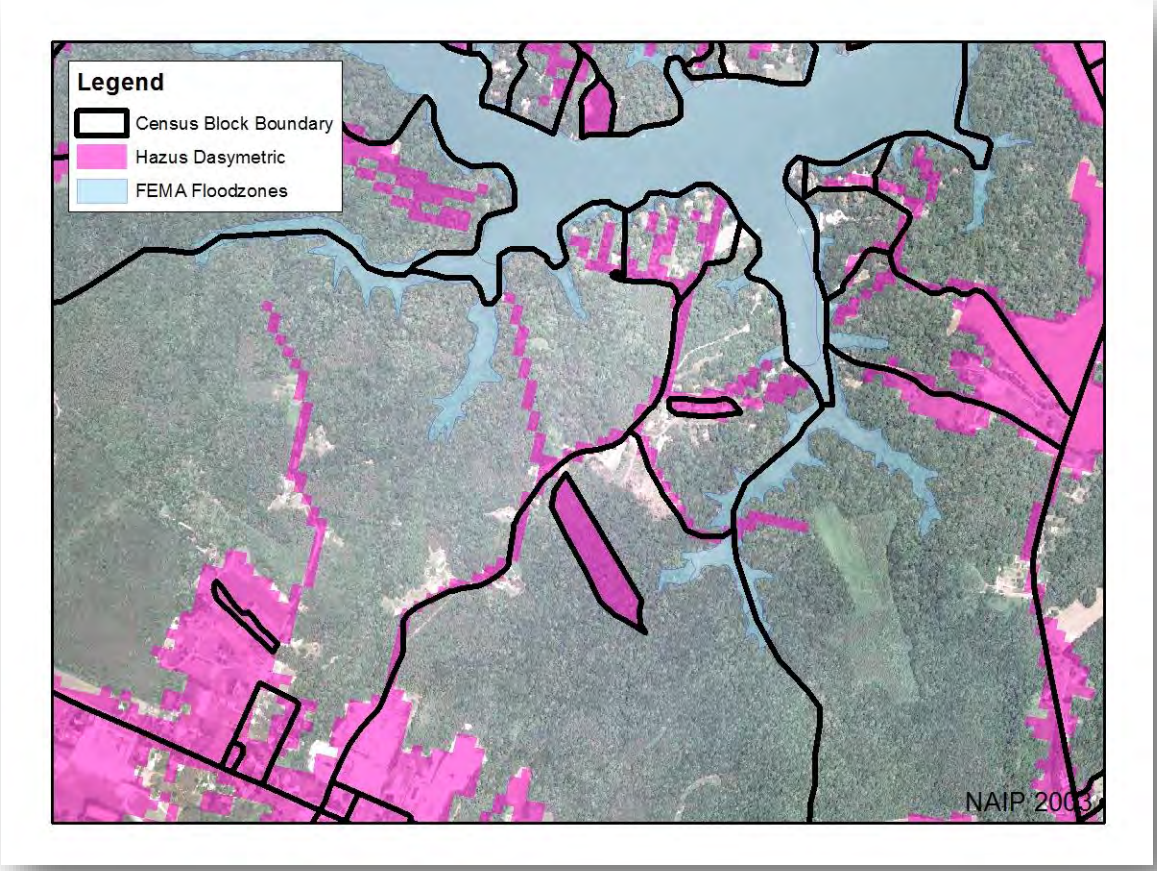
Figure 53:


HAZUS-MH: 0.1-Percent-Annual-Chance Wind Speed
N
Caroline County
Essex County
Westmoreland County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King William County
King & Queen County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Peak Gust Wink Speed (mph)
39 - 73 (Tropical Storm)
74 - 95 (Category 1)
96 - 100 (Category 2)
111 - 130 (Category 3)
131 - 155 (Category 4)
0 2 4 8 12 16
Miles
Description:
HAZUS_MH hurricane wind model makes use of an existing state-of-the-art windfield model, which has been calibrated to and valudated using full-scale hurricane data. The model calculates wind speeds as a funciton of central pressure, translation speed, and surface roughness.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS_MH v. 4.2 County Boundaries
Building Information - 2010 US Cenus Data

Hazus Building Stock (Inventory of Buildings and Facilities)

Hazus general building stock is an inventory of the built environment that is at risk of damage by a hazard. Each respective type or sub-type of building in the following categories; residential, commercial, industrial, agricultural, religious, government, and education has risk based on the replacement value for buildings in that use category, the size and construction of these buildings, and the replacement cost to rebuild if the building is destroyed. For the damage calculations, Hazus assumes that all buildings are evenly distributed throughout a given census block and therefore damage is estimated as a percent and is weighted by the area of inundation at a given depth for a given census block. The methodology therefore, is known as an area-weighted methodology.

FEMA has initiated recent improvements to the area-weighted methodology by further refining the distribution of building square-footage to land areas characterized by development and removing land areas typical of non-developed land classes (e.g., forests, wetlands, etc…). This refinement is called dasymetric mapping and the current Plan modeling utilizes the FEMA dasymetric building stock. The following image shows a small example area in which the developed areas are pink:



Use of the new dasymetric data will typically reduce the total area subject to area-weighted loss estimations - particularly for those census blocks that have flood risk but no actual development within the floodplains. A more detailed explanation is included in the Flood Hazard Analysis section.

General Building Stock Loss Estimation

The probabilistic Hazus hurricane analysis predicts that the Middle Peninsula can annually expect close to $2,766,673 in damages due to hurricane wind events. Property or "capital stock" losses of $2,618,514 make up about 95% of the damages. This includes the values for buildings, contents, and inventory. Business interruption accounts for approximately $148,159 of the annualized losses, or 5%, and includes relocation, income, rental, and wage costs.

Table 59 illustrates the expected annualized losses broken down by county. Gloucester County has the highest annualized losses of $1,396,164, accounting for 50% of the total losses for Middle Peninsula. The majority of the expected damages can be attributed to building and content value.

Mathews County has the second highest annualized losses of $505,371, accounting for 18% of the total annualized losses for Middle Peninsula.

Building structure damage accounts for approximately 66% of the expected annualized damages; residential occupancy makes up the vast majority of these losses. More than 70% of the buildings are categorized as wood frame and 20% masonry construction. Tables 60 and 61 summarize the property losses and business interruption losses shown by occupancy and building type. The slight differences in the annualized losses for building type and occupancy can be attributed to the Hazus classification methodology.

Table 59: County based Hazus annualized losses by all building and occupancy types.

County	Building	Content	Inventory	Relocation	Income	Rental	Wage	Total
Essex	$121.15	$56.91	$0.32	$5.98	$0.39	$2.04	$0.78	$187.57
Gloucester	$898.06	$430.14	$0.56	$44.51	$2.91	$14.72	$5.25	$1,396.16
King and Queen	$74.93	$32.73	$0.05	$3.41	$0.06	$0.97	$0.10	$112.25
King William	$139.26	$47.41	$0.21	$5.78	$0.26	$1.92	$0.73	$195.57
Mathews	$314.98	$164.44	$0.20	$18.05	$0.85	$5.75	$1.09	$505.37
Middlesex	$268.35	$68.54	$0.26	$21.92	$1.33	$7.37	$1.99	$369.75
Total	**$1,816.73**	**$800.17**	**$1.62**	**$99.65**	**$5.80**	**$32.77**	**$9.94**	**$2,766.67**
% Total	66%	29%	< 1%	3%	< 1%	1%	< 1%	100%
All values are in thousands of dollars								

Table 60: Annualized losses by general building type in the middle peninsula region.

Building Type	Building	Contents	Inventory	Relocation	Income	Rental	Wage	Annualized Losses
Concrete	$5.83	$2.31	$0.20	$1.21	$0.51	$0.74	$1.09	$11.88
Masonry	$398.89	$139.56	$0.33	$24.41	$1.71	$8.41	$3.03	$576.32
MH	$53.64	$10.47	$0.00	$4.53	$0.00	$0.63	$0.00	$69.27
Steel	$27.52	$11.58	$0.92	$4.65	$2.33	$2.09	$3.95	$53.06
Wood	$1,338.16	$636.83	$0.17	$64.84	$1.26	$20.92	$1.87	$2,064.04
Annualized Losses	$1,824.05	$800.75	$1.62	$99.65	$5.80	$32.77	$9.94	$2,774.57
% of Ann. Loss	66%	29%	< 1%	3%	< 1%	1%	< 1%	100%
All values (except percentages) are in thousands of dollars								

Table 61: Annualized losses by general occupancy type in the middle peninsula region.

Occupancy Type	Building	Contents	Inventory	Relocation	Income	Rental	Wage	Annualized Losses
Residential	$1,746.96	$772.31	$0.00	$88.87	$0.05	$28.46	$0.11	$2,636.76
Commercial	$42.42	$14.83	$0.37	$7.11	$4.60	$3.94	$5.28	$78.57
Industrial	$10.52	$6.48	$1.12	$0.66	$0.13	$0.10	$0.21	$19.22
Non-Profit	$5.74	$1.51	$0.00	$0.87	$0.55	$0.08	$1.30	$10.06
Education	$7.03	$3.21	$0.00	$1.40	$0.43	$0.10	$1.02	$13.19
Government	$1.65	$0.72	$0.00	$0.34	$0.02	$0.08	$2.00	$4.81
Agricultural	$2.39	$1.11	$0.13	$0.40	$0.01	$0.02	$0.01	$4.06
Annualized Losses	$1,816.73	$800.17	$1.62	$99.65	$5.80	$32.77	$9.94	$2,766.67
% of Ann. Loss	66%	29%	< 1%	3%	< 1%	1%	< 1%	100%
All values (except percentages) are in thousands of dollars								

Table 62: County based Hazus annualized losses by general building type.

County	Total Exposure	Concrete	Masonry	Manufactured Homes	Steel	Wood	Annualized Losses
Essex	$1,436,867	$1.20	$39.92	$5.10	$4.98	$136.55	$187.76
Gloucester	$4,988,369	$6.11	$284.60	$29.71	$26.57	$1,051.57	$1,398.56
King and Queen	$726,010	$0.15	$21.71	$4.01	$0.81	$85.82	$112.50
King William	$2,131,234	$0.79	$43.08	$2.70	$3.35	$146.30	$196.22
Mathews	$1,289,697	$1.34	$99.76	$14.78	$6.77	$384.01	$506.66
Middlesex	$1,892,206	$2.29	$87.25	$12.97	$10.58	$259.79	$372.88
Annualized Losses		$11.88	$576.32	$69.27	$53.06	$2,064.04	$2,774.57
% of Annualized Losses		< 1%	21%	3%	2%	74%	Hazus (V4.2) results
% of Total Exposure		< 1%	< 1%	< 1%	< 1%	< 1%	
All values (except percentages) are in thousands of dollars							

Table 63: County based Hazus annualized losses by general occupancy type.

County	Total Exposure	Residential	Commercial	Industrial	Non-Profit	Education	Gov.	Agriculture	Annualized Losses
Essex	$1,436,867	$175.25	$6.44	$3.84	$0.57	$0.51	$0.49	$0.47	$187.57
Gloucester	$4,988,369	$1,331.52	$39.52	$6.27	$5.12	$9.77	$2.36	$1.59	$1,396.16
King and Queen	$726,010	$109.93	$0.95	$0.67	$0.42	$0.08	$0.06	$0.14	$112.25
King William	$2,131,234	$186.68	$3.99	$2.55	$0.85	$0.37	$0.67	$0.47	$195.57
Mathews	$1,289,697	$489.67	$9.58	$2.80	$1.53	$0.64	$0.44	$0.69	$505.37
Middlesex	$1,892,206	$343.70	$18.09	$3.09	$1.58	$1.81	$0.79	$0.69	$369.75
Annualized Losses		$2,636.76	$78.57	$19.22	$10.06	$13.19	$4.81	$4.06	$2,766.67
% of Annualized Losses		95%	3%	< 1%	< 1%	< 1%	< 1%	< 1%	Hazus (V4.2) results
% of Exposure		< 1%	< 1%	< 1%	< 1%	< 1%	< 1%	< 1%	
All values (except percentages) are in thousands of dollars									

Figures 54 through 61 on the following pages show the total annualized losses mapped for the planning district and individual counties. The majority of damages occur to residential structures. Tables 62 and 63 summarize the annualized loss values by county. These values are broken down by building type and

general occupancy for comparison. Total exposure has been included as a reference point for damages. Wood structures account for seventy-four percent of the total annualized damages. As wood structures make up the majority of construction type in general stock building inventory this is in line with the source data. The next highest category of damage by construction type is seen in masonry structures representing approximately twenty-one-percent of the total annualized damages. This also aligns with masonry (brick or block) construction being the second most common building material type in the Middle Peninsula region.

Figure 54:

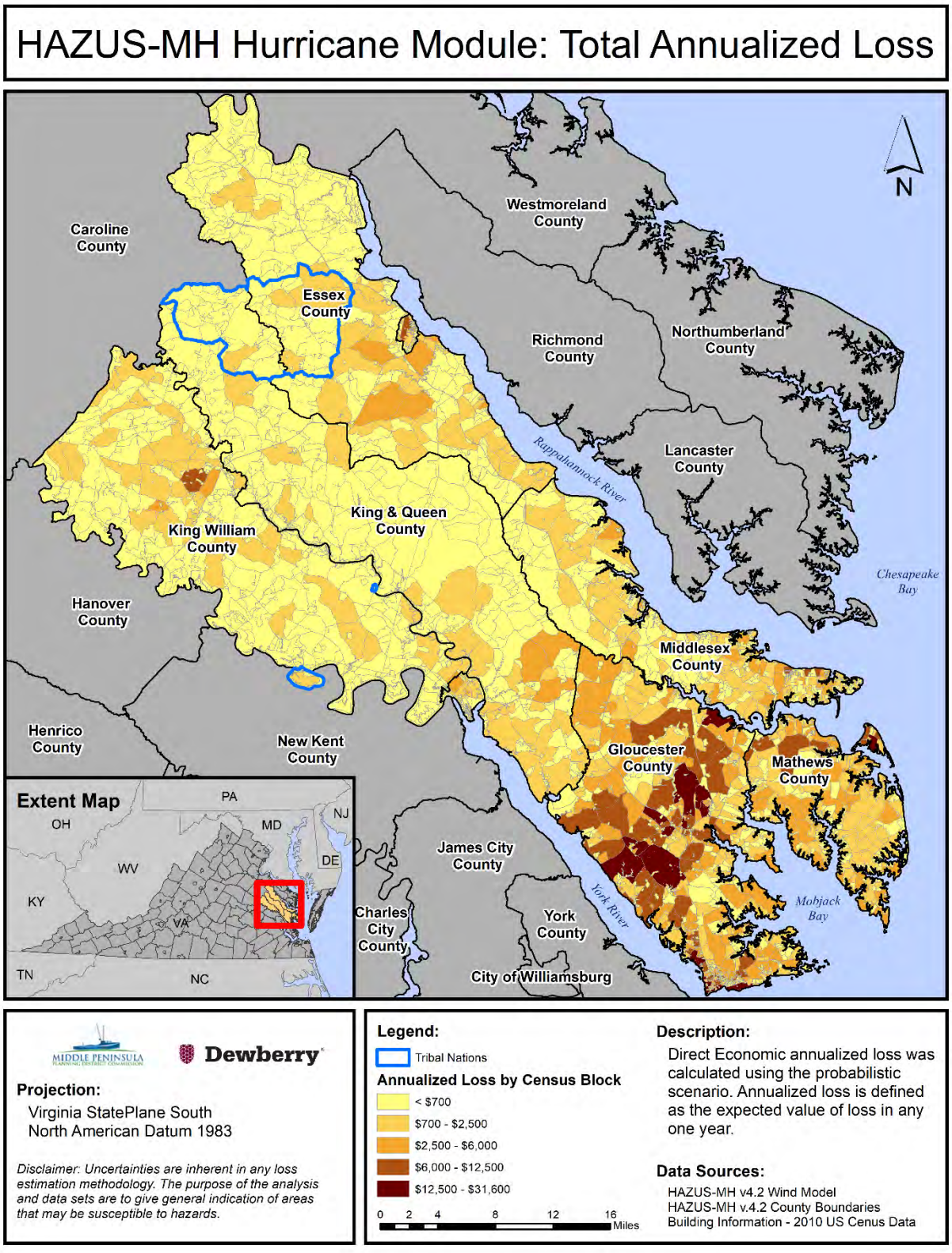

HAZUS-MH Hurricane Module: Total Annualized Loss
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 2 4 8 12 16
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 55:

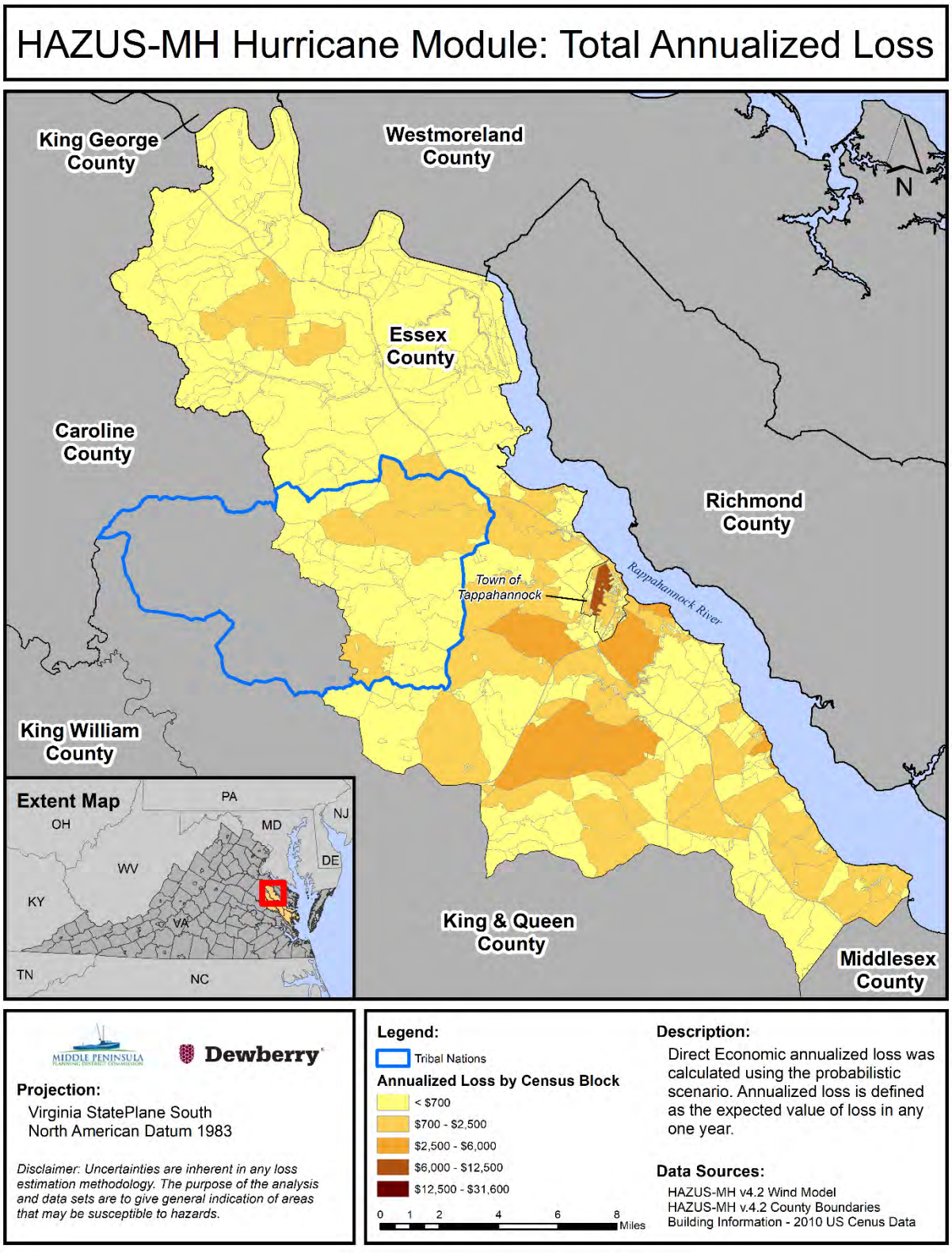

HAZUS-MH Hurricane Module: Total Annualized Loss
King George County
Westmoreland County
Essex County
Caroline County
Richmond County
King William County
King & Queen County
Middlesex County
Town of Tappahannock
Rappahannock River
N
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 1 2 4 6 8 Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 56:

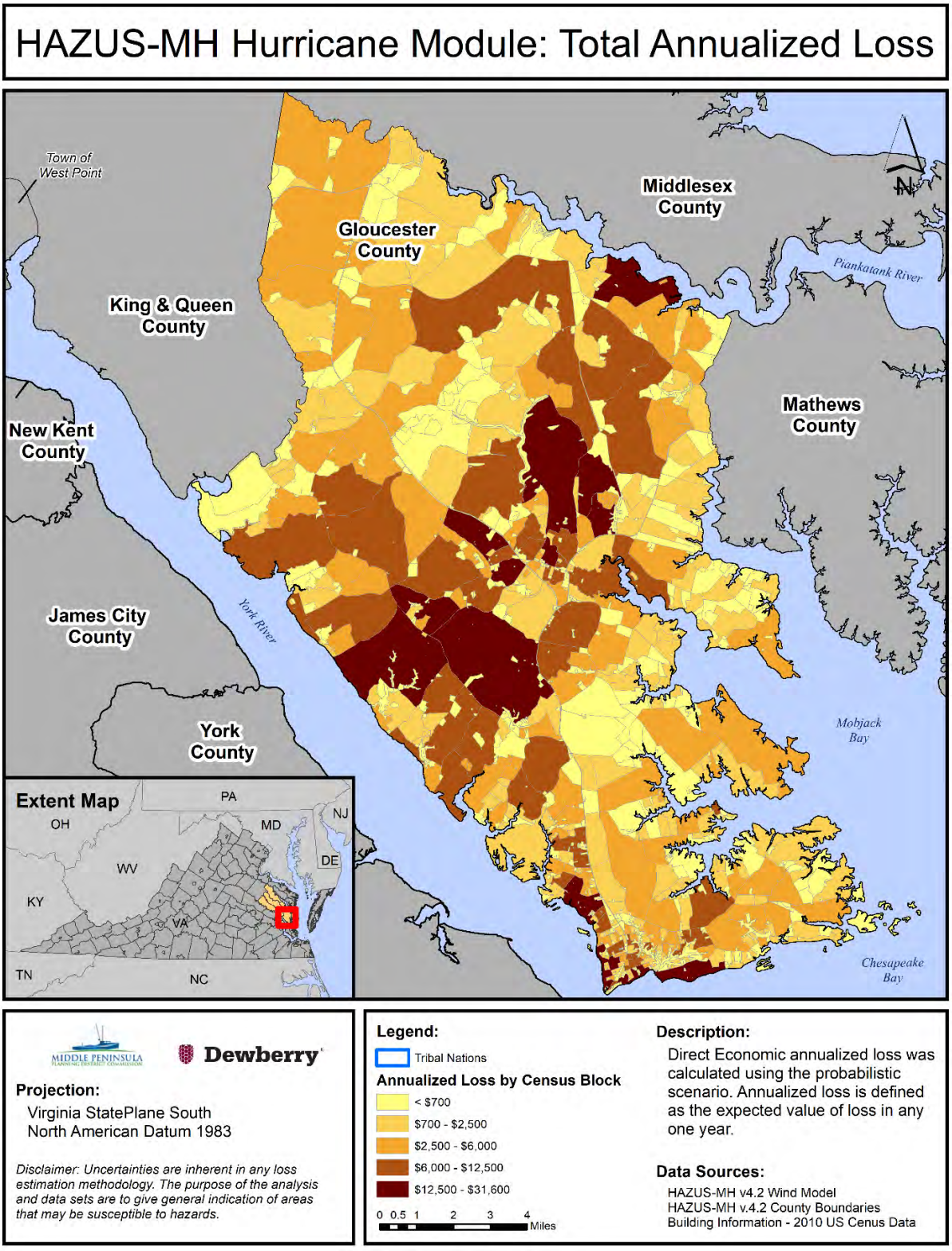

HAZUS-MH Hurricane Module: Total Annualized Loss
Town of West Point
Middlesex County
Gloucester County
Piankatank River
King & Queen County
Mathews County
New Kent County
James City County
York River
York County
Mobjack Bay
Chesapeake Bay
N
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 0.5 1 2 3 4
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 57:

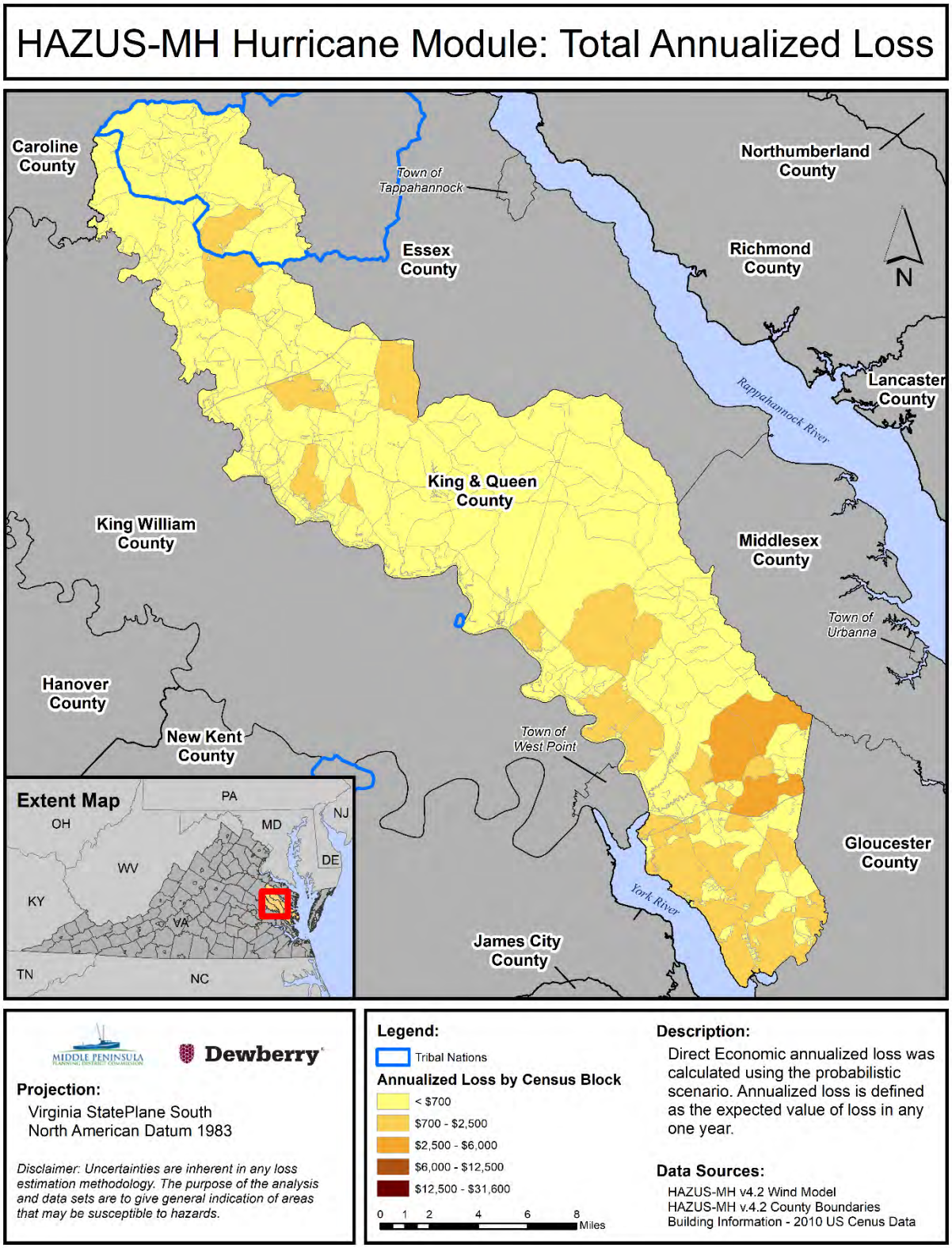

HAZUS-MH Hurricane Module: Total Annualized Loss
Caroline County
Town of Tappahannock
Essex County
Northumberland County
Richmond County
N
Rappahannock River
Lancaster County
King & Queen County
King William County
Middlesex County
Town of Urbanna
Hanover County
New Kent County
Town of West Point
Gloucester County
York River
James City County
Extent Map
PA
OH
MD
NJ
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA PLANNING DISTRICT COMMISSION
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 1 2 4 6 8
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 58:

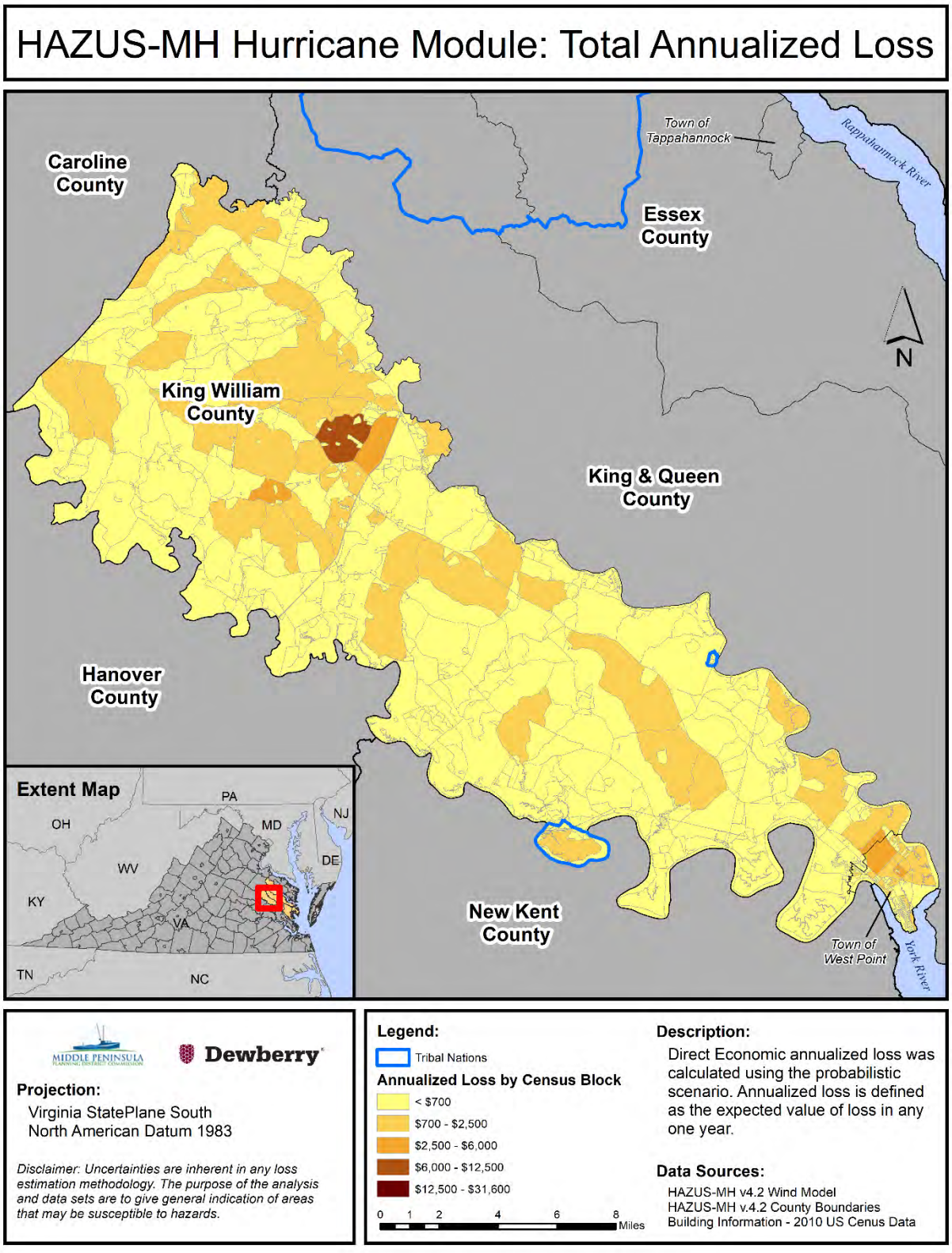

HAZUS-MH Hurricane Module: Total Annualized Loss
Caroline County
Town of Tappahannock
Rappahannock River
Essex County
N
King William County
King & Queen County
Hanover County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
New Kent County
Town of West Point
York River
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 1 2 4 6 8
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 59:

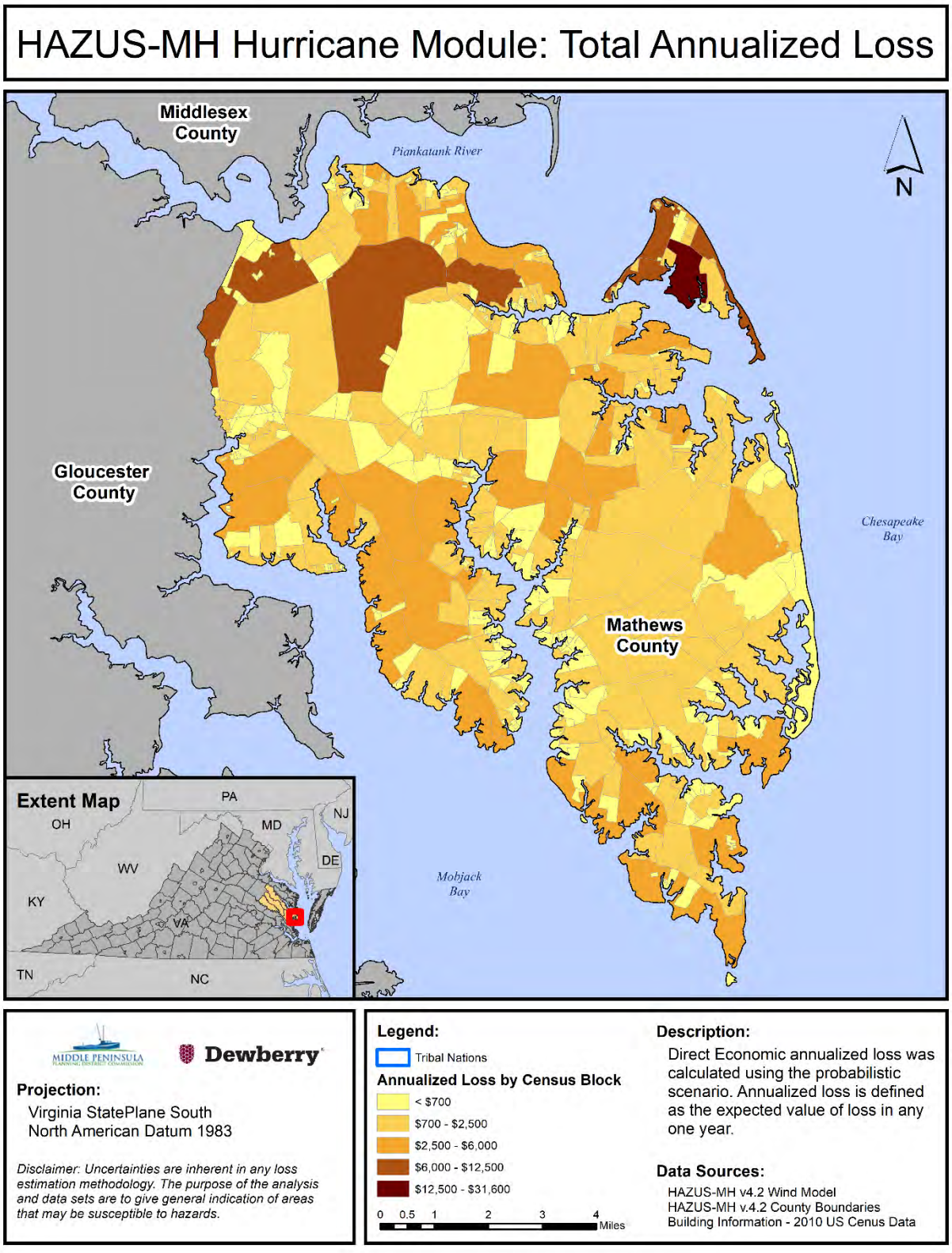

HAZUS-MH Hurricane Module: Total Annualized Loss
Middlesex County
Piankatank River
N
Gloucester County
Chesapeake Bay
Mathews County
Mobjack Bay
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 0.5 1 2 3 4
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 60:

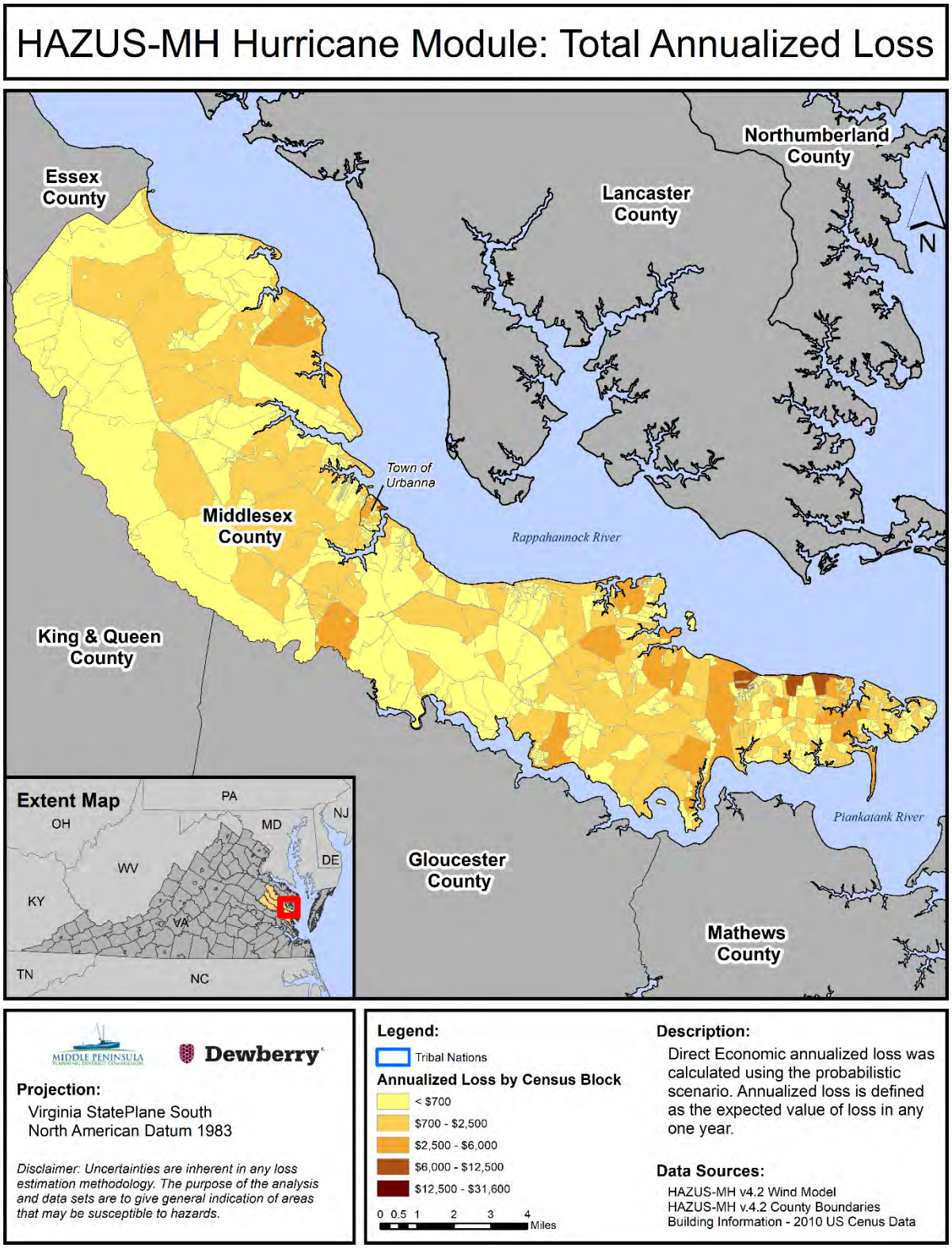
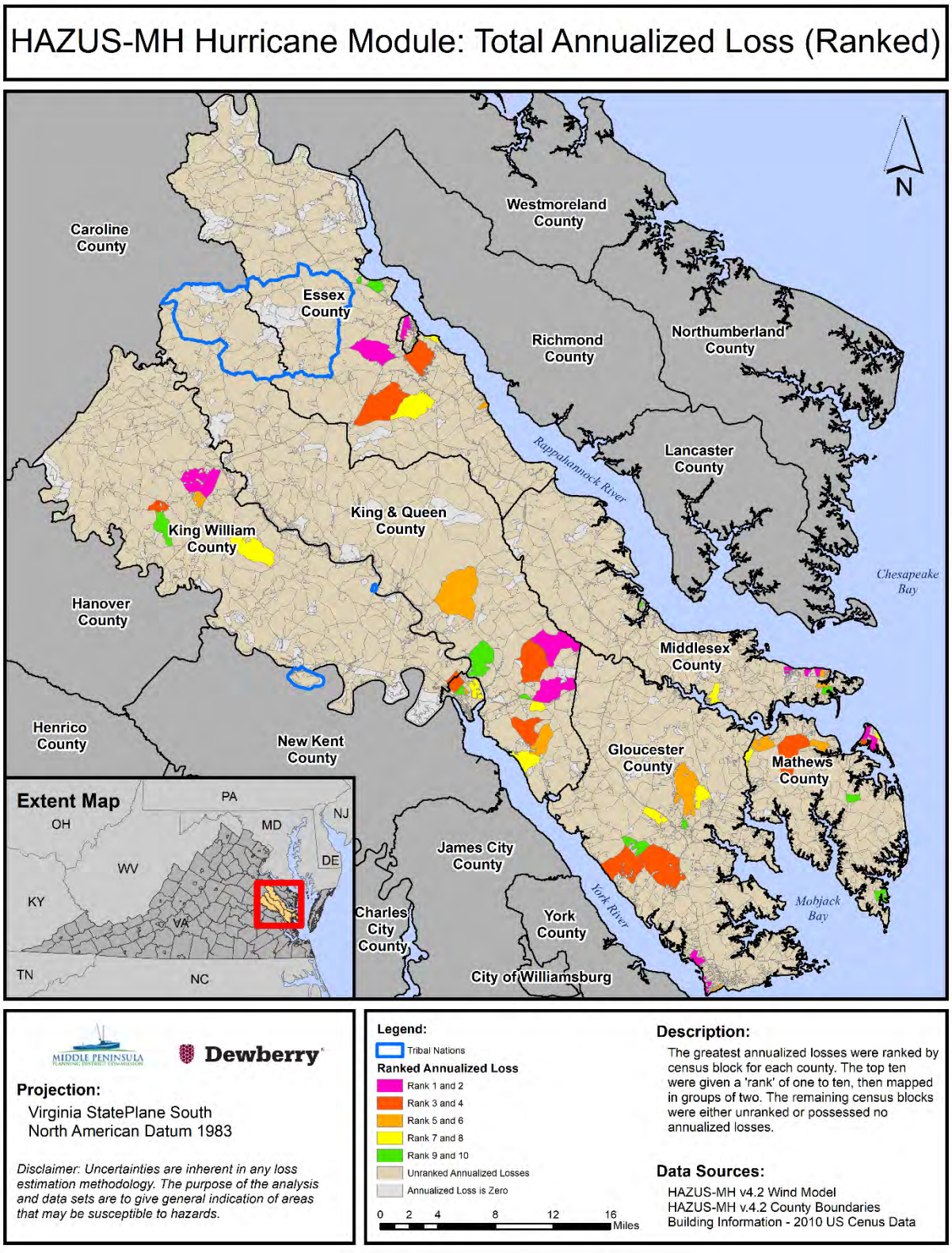

HAZUS-MH Hurricane Module: Total Annualized Loss
Essex County
Lancaster County
Northumberland County
N
Town of Urbanna
Middlesex County
Rappahannock River
King & Queen County
Extent Map
PA
OH
MD
NJ
WV
DE
KY
VA
TN
NC
Piankatank River
Gloucester County
Mathews County
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Annualized Loss by Census Block
< $700
$700 - $2,500
$2,500 - $6,000
$6,000 - $12,500
$12,500 - $31,600
0 0.5 1 2 3 4
Miles
Description:
Direct Economic annualized loss was calculated using the probabilistic scenario. Annualized loss is defined as the expected value of loss in any one year.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Figure 61:


HAZUS-MH Hurricane Module: Total Annualized Loss (Ranked)
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York River
York County
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Nations
Ranked Annualized Loss
Rank 1 and 2
Rank 3 and 4
Rank 5 and 6
Rank 7 and 8
Rank 9 and 10
Unranked Annualized Losses
Annualized Loss is Zero
0 2 4 8 12 16
Miles
Description:
The greatest annualized losses were ranked by census block for each county. The top ten were given a 'rank' of one to ten, then mapped in groups of two. The remaining census blocks were either unranked or possessed no annualized losses.
Data Sources:
HAZUS-MH v4.2 Wind Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data

Fifty-percent of the Middle Peninsula region's annualized losses occur in Gloucester County. While losses are distributed throughout Gloucester County a few patterns of concentrated losses may be identified. Many of the census blocks exhibiting annualized losses of $10,000 or greater follow along the State Route 17 corridor or are clustered around the Gloucester Courthouse. More specifically the majority of annualized losses align from Gloucester Courthouse to the York River bounded on the North by County 606 or Ark Road and the south by Nursery Lane, Haynes Pond, and Carter Creek – this area accounts for approximately $230,000 (or approximately 16%) of expected annualized damages. On the northern side of Gloucester Courthouse, the area generally bounded in the west by Beech Swamp and Cow Creek in the east, and being traversed by Indian Road through the middle and extending north-east to the Piankatank River in the vicinity of Ferry Creek at Hell Neck – this area accounts for approximately $200,000 (or approximately 14%) of expected annualized damages. Finally, those census blocks having the greatest expected annualized losses are in the vicinity of Hayes and Gloucester Point along the York River where as much as $385,000 (or approximately 27% - and greater) of annualized damages are estimated.

Losses in Mathews County are also spread throughout the county with pockets of higher loss in the northern one-third of the county. Approximately $231,000 (or 46%) of estimated annualized damages can be attributed to the northern one-third of the County; versus approximately $157,000 (or 31%) in the center and $115,000 (or 23%) in the southern one-third. Compared to Gloucester County, Mathews only has two (2) census blocks having expected annualized losses of $10,000 or greater, versus eighteen (18) such blocks in Gloucester. Mathews County accounts for approximately $507,000 (or 18%) of the total annualized losses in the planning district.

Middlesex County accounts for 13% of the total annualized losses. The greatest concentration of estimated annualized losses is in the lower-eastern portion of the County; Gray's Point Road and south-eastward. This south-eastern portion of the County includes approximately $260,000 (or 70%) of the estimated damages for the County. Other concentrations of estimated damages are distributed between Saluda, Urbanna and Water View. Urbanna accounts for approximately 7% of the annualized losses at approximately $25,700. Urbanna also includes two (2) census blocks within the top ten ranked blocks within the County accounting for $12,400 or 48% of the losses in Urbanna.

Seven percent of the total annualized damages ($196,000) for the region are attributed to King William County. King William exhibits four (4) primary areas where losses are concentrated. The first being the Town of West Point which can be attributed with twenty-nine percent (29%) of the damages within the County having annualized losses of $56,000. Next, there are two (2) areas near both Aylett and Manquin on the northern side of US 360 (Richmond-Tappahannock Highway). These two areas combined account for annualized losses of $30,000 or fifteen percent (15%). Last, the central portion of the County includes an area on either side of King William Road from West River Road in the north to Horse Landing Road in the south and accounting for roughly $11,200 or six percent (6%) of annualized losses. The remainder of losses are distributed throughout the County with the greatest concentration of loss in the northwest quarter of the County. The Pamunkey Indian Reservation is estimated to have annualized losses of $1,284 and the Mattaponi Reservation close to $905; combined these two Indian Reservation losses account for approximately 1.1% of the annualized losses throughout the County.

Essex County accounts for 7% of the total annualized losses. The greatest concentration of potential annualized wind damage exists in the central portion of the County – including the Town of Tappahannock. This central area is traversed by three (3) of the primary roads being, US 360 (Richmond Highway), US 17 (Tidewater Trail) and Tappahannock Boulevard – running through the Town of Tappahannock. The combined annualized losses for this general area are approximately $94,000 or fifty percent (50%) of the losses within the County. The Town of Tappahannock accounts for twenty-percent

(20%) of the damages in the County and an estimated $37,200 in annualized damages. Two pockets of development along the Rappahannock River (one south of Tappahannock and the other on the north side) represent clusters of potential damages. The area to the south of Tappahannock exists in the vicinity of River Landing Road in the north and Mill Swamp Road in the south having potential damages of $11,300 annually. The area north of Tappahannock is the vicinity near Woodside Country Club having potential damages of $9,700 annually.

King and Queen County has the lowest annualized losses in the region, accounting for 4% of the total damages. Residential occupancy makes up the majority of the losses in the county. The southern one-third of the county, from roughly Dragon Run State Forest southward, has the greatest concentration of losses across the entire County accounting for nearly $66,000 or 60% of the losses. The remaining 40% of potential losses are distributed through the remainder of the county to the north and west with approximately $16,400 or 14% existing north of the Richmond-Tappahannock Highway and twenty-six percent (26%) distributed between the Richmond-Tappahannock Highway in the north to roughly Dragon Run State Forest in the south; note that this area includes locales such as Bruington, King and Queen Courthouse as well as Walkerton. The Rappahannock Tribe's TDSA is estimated to have annualized losses of $16,123, which is 0.58% of the Middle Peninsula total. Table 65 lists the Tribal Nations annual hurricane losses.

Table 64 lists the annualized losses for the Middle Peninsula Tribal Nations. Please note that the Upper Mattaponi is not represented in this data but is included in the county data. GIS boundaries were sourced from the "American Indian/Alaska Native/Native Hawaiian Areas" as identified in the 2020 TIGER/Line GIS data, which is publicly available from the U.S. Census Bureau's website. (https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html). This website defines Reservation and TDSA areas as:

- *American Indian Reservations: The U.S. Census bureau's boundary files for American Indian reservations are areas with boundaries established by treaty, statute, and/or executive or court order. The reservations and their boundaries are identified for the Census Bureau by the Bureau of Indian Affairs (BIA), an agency in the U.S. Department of the Interior, or by State governments.*

- *Tribal Designated Statistical Areas: the U.S. Census Bureau includes Tribal designated statistical areas that are geographic entities delineated by Federally and State-recognized tribes without a land base, that is, with no reservation or trust lands.* (https://www2.census.gov/geo/pdfs/reference/GARM/Ch5GARM.pdf):

It's important to note that upon correspondences with the Tribes this data does not accurately reflect Tribal lands and will need to be updated for the next update.

Table 64: Tribal Nation based Hazus annualized losses.

Tribal Nation	Total Annualized Loss
Mattaponi Indian Reservation	$905 (5%)
Pamunkey Indian Reservation	$1,284 (7%)
Rappahannock Tribe's TDSA	$16,123 (88%)
Total Tribal Losses	**$18,312**

Building Damage

Hazus calculates expected damage percentages for each probabilistic return period for wind damages. This represents the percentage of building square footage in each damage state. Five damage states have been specified in Hazus and are outlined in Table 65.

Table 65: Hazus damage state thresholds.

Damage State	Qualitative Damage Description
None (Livable)	Little or no visible damage from the outside. No broken windows, or failed roof deck. Minimal loss of roof over, with no or very limited water penetration.
Minor (Livable)	Maximum of one broken window, door or garage door. Moderate roof cover loss that can be covered to prevent additional water entering the building. Marks or dents on wall requiring painting or patching for repair.
Moderate (Typically still livable)	Major roof cover damage, moderate window breakage. Minor roof sheathing failure. Some resulting damage to interior of building from water.
Severe (Typically non-livable but repairable)	Major window damage or roof sheathing loss. Major roof cover loss. Extensive damage to interior from water.
Destruction (Non-livable)	Complete roof failure and/or, failure of wall frame. Loss of more than 50% of roof sheathing.
Hazus V4.2 Technical Manual	

Building Damage by Annual Chance Frequency (i.e., Multi-frequency Building Damages)

- **10-percent-annual-chance** - Hazus estimates that about 1 building will have minor damage. No buildings (0) are expected to be at least moderately damaged, and no buildings (0) are expected to be completely destroyed during the 10-percent-annual-chance.
- **4-percent-annual-chance** - Hazus estimates that about 88 buildings will have minor damage. No buildings (0) are expected to be at least moderately damaged, and no buildings (0) are expected to be completely destroyed during the 5-percent-annual-chance.
- **2-percent-annual-chance** - Hazus estimates that about 4 buildings will be at least moderately damaged, and no buildings (0) are expected to be completely destroyed during the 2-percent-annual-chance.
- **1-percent-annual-chance** - Hazus estimates that about 36 buildings will be at least moderately damaged and five (5) buildings are expected to have severe damage – potentially another single (1) building may be expected to be completely destroyed during the 1-percent-annual-chance.
- **0.5-percent-annual-chance** - Hazus estimates that about 171 buildings will be at least moderately damaged, approximately 25 buildings are expected to be severely damaged, and two (2) buildings are expected to be completely destroyed during the 0.5-percent-annual-chance.
- **0.2-percent-annual-chance** - Hazus estimates that about 791 buildings will be at least moderately damaged, approximately 113 buildings are expected to be severely damaged, and twelve (12) buildings are expected to be completely destroyed during the 0.2-percent-annual-chance.
- **0.1-percent-annual-chance** - Hazus estimates that about 1,935 buildings will be at least moderately damaged, approximately 398 buildings are expected to be severely damaged, and 46 buildings are expected to be completely destroyed during the 0.1-percent-annual-chance.

Table 67 and Appendix G provide detailed information on the damage state percentages and number of buildings damaged for each of the probabilistic return periods.

The default data and parameters for each building stock category, have damages that are calculated based on the probabilities of the four different damage states of wind damage by building type. Damage is calculated as a function of peak gust wind speed. It should be noted that the results in Table 66 are based solely on the modeled direct economic loss for the study region with the simulated hurricane activity for each of the independent return periods. It is possible, that the results will not increase as logically expected by each return period. For example, with this methodology, it is possible to have the results of the 1-percent-annual-chance event show more dollar damage than the 0.2-percent-annual-chance event's result.

Table 66: Building damage by county.

Essex County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	100.00%	-	-	-	-
5-percent-annual-chance Event	99.82%	0.18%	-	-	-
2-percent-annual-chance Event	99.72%	0.28%	-	-	-
1-percent-annual-chance Event	99.56%	0.44%	-	-	-
0.5-percent-annual-chance Event	98.73%	1.22%	0.05%	0.01%	-
0.2-percent-annual-chance Event	91.34%	7.41%	1.05%	0.18%	0.02%
0.1-percent-annual-chance Event	89.45%	8.86%	1.42%	0.25%	0.03%

King William County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	100.00%	-	-	-	-
5-percent-annual-chance Event	99.83%	0.17%	-	-	-
2-percent-annual-chance Event	99.69%	0.31%	-	-	-
1-percent-annual-chance Event	99.55%	0.44%	-	-	-
0.5-percent-annual-chance Event	98.70%	1.24%	0.05%	0.01%	-
0.2-percent-annual-chance Event	91.47%	7.29%	1.04%	0.18%	0.02%
0.1-percent-annual-chance Event	98.99%	0.96%	0.04%	0.01%	-

Gloucester County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	99.98%	0.02%	-	-	-
5-percent-annual-chance Event	99.79%	0.21%	-	-	-
2-percent-annual-chance Event	99.29%	0.69%	0.02%	-	-
1-percent-annual-chance Event	97.83%	2.01%	0.14%	0.02%	-
0.5-percent-annual-chance Event	94.36%	4.92%	0.61%	0.11%	0.01%
0.2-percent-annual-chance Event	90.64%	7.92%	1.22%	0.21%	0.02%
0.1-percent-annual-chance Event	92.25%	6.63%	0.94%	0.17%	0.01%

Mathews County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	99.91%	0.09%	-	-	-
5-percent-annual-chance Event	99.81%	0.19%	-	-	-
2-percent-annual-chance Event	99.51%	0.49%	0.01%	-	-
1-percent-annual-chance Event	98.02%	1.86%	0.10%	0.02%	-
0.5-percent-annual-chance Event	95.19%	4.31%	0.43%	0.07%	0.01%
0.2-percent-annual-chance Event	88.88%	9.19%	1.62%	0.28%	0.03%
0.1-percent-annual-chance Event	61.41%	23.50%	11.63%	3.07%	0.39%

King & Queen County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	100.00%	-	-	-	-
5-percent-annual-chance Event	99.83%	0.17%	-	-	-
2-percent-annual-chance Event	99.69%	0.31%	-	-	-
1-percent-annual-chance Event	99.45%	0.54%	0.01%	-	-
0.5-percent-annual-chance Event	98.32%	1.58%	0.09%	0.02%	-
0.2-percent-annual-chance Event	90.54%	7.97%	1.23%	0.24%	0.02%
0.1-percent-annual-chance Event	96.99%	2.76%	0.21%	0.04%	-

Middlesex County	Average Damage State (%)				
Return Period	None	Minor	Moderate	Severe	Destruction
10-percent-annual-chance Event	100.00%	-	-	-	-
5-percent-annual-chance Event	99.80%	0.20%	-	-	-
2-percent-annual-chance Event	99.57%	0.43%	-	-	-
1-percent-annual-chance Event	98.61%	1.33%	0.06%	0.01%	-
0.5-percent-annual-chance Event	96.36%	3.33%	0.26%	0.04%	-
0.2-percent-annual-chance Event	84.41%	12.42%	2.69%	0.42%	0.05%
0.1-percent-annual-chance Event	66.63%	20.24%	9.88%	2.92%	0.34%

Debris Generation

Hazus estimates the amount of debris that will be generated by a hurricane. The model breaks the debris into three general categories: Brick/Wood, Reinforced Concrete/Steel, and Trees. Tree debris makes up the majority of tonnage generated in the hurricane analysis. Brick and wood debris make up the remainder, and a very small percentage (0.01%) associated with Concrete and Steel; i.e., not shown in Table. Table 67 summarizes, by return period, the total generated debris by Type.

Table 67: Hurricane debris generation.

Return Period	Total Debris (tons)	Tree Debris (tons)	% Tree Debris	Brick & Wood (tons)	% Brick and Wood
10-percent-annual-chance Event	1,620	1,620	100%	0	0.00%
5-percent-annual-chance Event	23,563	23,543	99.92%	20	0.08%
2-percent-annual-chance Event	71,500	70,986	99.28%	514	0.72%
1-percent-annual-chance Event	151,807	150,011	98.82%	1,796	1.18%
0.5-percent-annual-chance Event	324,883	320,453	98.64%	4,424	1.36%
0.2-percent-annual-chance Event	736,194	724,232	98.38%	11,882	1.61%
0.1-percent-annual-chance Event	699,604	676,766	96.74%	22,165	3.17%

Essential Facilities

Essential facilities, including medical care facilities, emergency response facilities and schools, are those vital to emergency response and recovery following a disaster. School buildings are included in this category because of the key role they often play in sheltering people displaced from damaged homes. Generally, there are very few of each type of essential facilities in a census tract, making it easier to obtain site-specific information for each facility. Thus, damage and loss-of-function are evaluated on a building-by-building basis for this class of structures; even through the uncertainty in each such estimate is large[6].

The Hazus essential facilities database includes default data for Medical Care Facilities, Emergency Response Facilities (fire stations, polices stations, EOCs) and schools. Table 68 shows the functionality, by return period for each essential facility type. The region's essential facilities are able to remain functional for the 10-percent-, 5-percent-, and 1-percent-annual-chance recurrence interval. Functionality begins to decline at the 1-percent-annual-chance event. All of the facilities have zero functionality during the 0.1-percent-annual-chance event.

[6] Multi-hazard Loss Estimation Methodology Hurricane Model User Manual, HAZUS-MH V4.2, Chapter 1: Introduction, 1-6

Table 68: Essential facility functionality for specified return periods.

Return Period	Fire Stations	Hospitals	Police Stations	Schools
10-percent-annual-chance Event	100%	100%	100%	100%
5-percent-annual-chance Event	100%	100%	100%	100%
2-percent-annual-chance Event	100%	100%	100%	100%
1-percent-annual-chance Event	90%	100%	100%	92%
0.5-percent-annual-chance Event	70%	100%	91%	84%
0.2-percent-annual-chance Event	50%	62%	55%	40%
0.1-percent-annual-chance Event	0%	0%	0%	0%

Potential Mitigation Actions:
The potential mitigation actions noted are those that are Hazus-specific and would benefit refinement of Hazus analyses.

- ☐ In high damage Census blocks provide more information about acquiring for hurricane wind damage mitigation such as hurricane straps, hurricane storm window covers, and reduction of vegetation that becomes damaging storm debris during hurricane wind events.
- ☐ Perform Hurricane analysis for a known and historic storm that affected the Middle Peninsula region for comparative purposes.
- ☐ Refine and update data sets for GBS and essential facilities.
    - Improvements in the future should aim to further refine the building stock. Notably, one improvement should include adding any new development that may not have been in the land use/land cover data; e.g., new housing developments, new construction, etc…
    - Perform localized building-level assessments in known areas of loss and or areas subject to likely losses.
- ☐ Improve Data associated with the federally recognized tribes.

Seal Level Rise Risk Analysis

The Hazus Flood Model analyzes both riverine and coastal flood hazards. Flood hazard within Hazus is defined by depth of flooding. Other contributing factors of damage include the duration and velocity of water in the floodplain. Other hazards associated with flooding that may contribute to flood losses include channel erosion and migration, sediment deposition, bridge scour, and the impact of flood-born debris. The Hazus Flood Model allows users to estimate flood losses primarily due to flood depth to the general building stock (GBS). While velocity is also considered, it is not a separate input parameter and is accounted within depth-damage functions (i.e., expected percent damage given an expected depth) for census blocks that are defined as either coastal or riverine influenced.

Flood-specific modeling was performed in this Plan revision to determine annualized flood loss. However, it is important to note that the Sea Level Rise analyses while similar is not 100% the same as the multi-frequency analyses performed and presented in the Flood Section; see Flood Analysis. This section will offer a basic amount of information to differentiate between the two report sections.

Coastal flood modeling typically includes identifying baseline tidal water levels and then computing additions or increases to water surface levels from various natural forces such as storm surge effects (i.e., water level increases as the result of a storm pushing landward) as well as other wave-related effects such as increased wave heights and the run-up of waves over the land as waves crash. Other factors of coastal storms play a part in estimating increased water surface levels such as shoreline and/or dune erosion. Consequently, each of the scenarios presented in the Flood Analysis section includes depth grids which are produced from modeling that considers increases to water surface levels from the various forces typical of coastal storm events – a.k.a. Storm Surge.

In contrast, the Hazus analysis performed for the Sea Level Rise (SLR) scenarios (this section) DO NOT include the use of depth grids that consist of storm surge. Rather, this Sea Level Rise section uses depth grids that 1.) Are depths from the current baseline tidal water levels (Mean Higher High Water or MHHW) and 2.) Includes the addition of the Intermediate-High (IMH) Scenario's 2060 sea level estimate, which is a 3.02-feet increase in water depth. The two depth grids were run through Hazus represent these two aforementioned scenarios developed by NOAA's Office for Coastal Management in August 2016. The IMH selected is also consistent with Governor Northam's November 20219 Executive Order 45 that approves to except NOAA's IMH scenario as the planning standard for Virginia state owed buildings.

Another factor to consider while viewing Maps and Tables is that the Base Scenario is essentially the average of the highest tide that is experienced on a daily basis over a long period of time. Typical there are two high tides in a given day, the MHHW represents the mean (or average) of the higher of the two tides as recorded over a period of record. The definition as provided by NOAA – Tides & Currents states, "The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch. For stations with shorter series, comparison of simultaneous observations with a control tide station is made in order to derive the equivalent datum of the National Tidal Datum Epoch."[7] The tidal station within and used as reference for the water surface elevations in Middle Peninsula is the Gloucester Point Station.

NOAA Seal Level Rise Scenarios and Depth Grid Information

SLR depth grids were pulled from NOAA's Sea Level Rise Viewer to perform the risk assessments across the Middle Peninsula planning district. These depth grids were able to be directly imported into the Hazus Flood model, which eliminated the need to pre-process any modeling or Geographic

[7] NOAA – Tides & Currents (http://tidesandcurrents.noaa.gov/datum_options.html), accessed April 22, 2015.

Information Systems (GIS) data. Generally-speaking, the creation of depth grids requires GIS data that represents an estimated water surface along with an associated ground surface. Thereafter, the difference between the two surfaces represents the estimated depth of flooding for a given location; i.e., water elevation less ground elevation equals depth; see Depth Grid Graphic in the Flood Analysis Section.

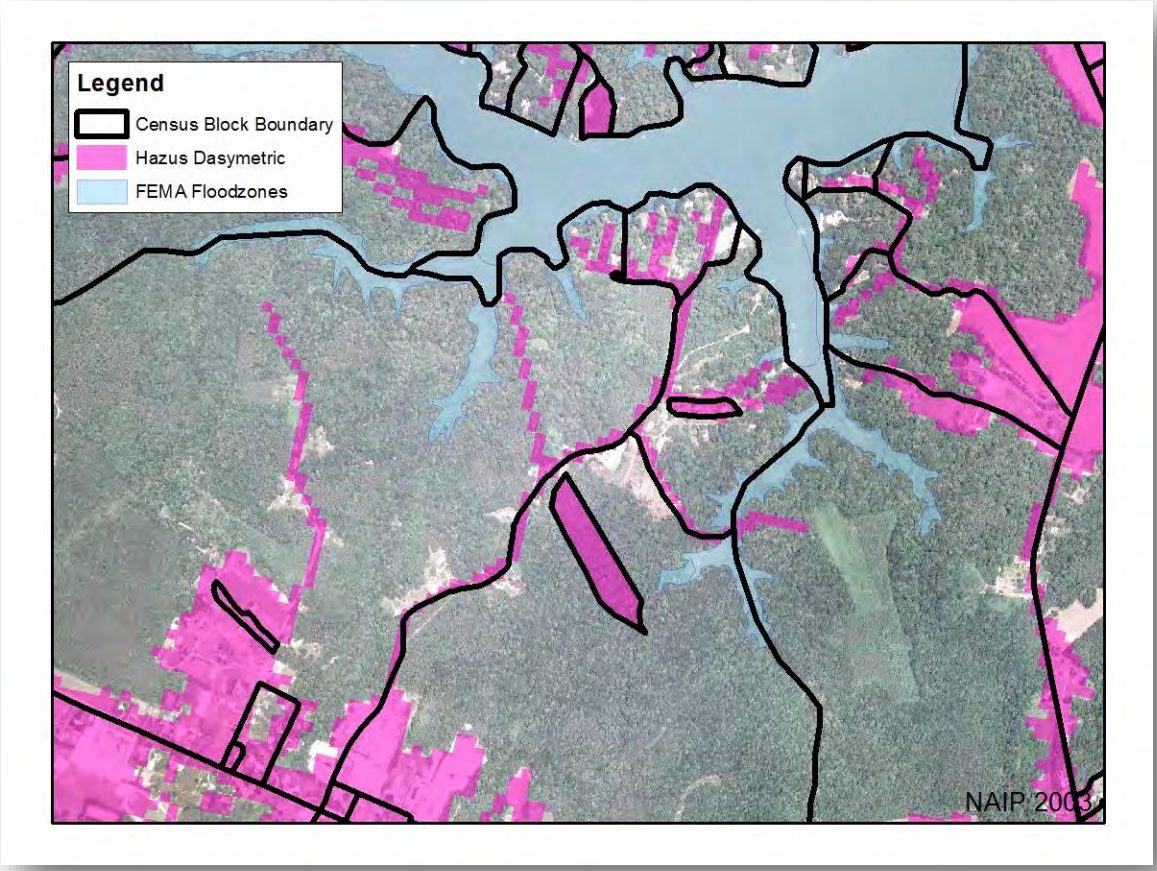
The data is available from Digital Coast, the NOAA-sponsored website developed to provide not only coastal data, but the tools, training, and information needed to use the provided data (see http://coast.noaa.gov/slr/). The following list offers an itemization and brief description(s) of the two scenarios:

- **Mean Higher High Water (MHHW)**
  - This is the average of the higher high water height of the highest tide recorded each tidal day at a given tide station observed over the National Tidal Datum Epoch. The closest tide station to Middle Peninsula is the Gloucester Point Station.
    - The National Tidal Datum Epoch is the specific 19-year period adopted by the National Ocean Service as the official time segment over which tide observations are taken and reduced to obtain mean values for a standard elevation defined by a certain phase of the tide, called tidal datums.
  - The MHHW at the Gloucester Point Station is 1.4 feet above mean sea level.
- **Intermediate-High (IMH) Scenario**
  - The IMH is based on an average of high-end, semi-empirical, global sea level rise projections (Grinsted et al., 2009; Horton et al., 2008; Jevrejeva et al., 2010; Vermeer and Rahmstorf, 2009).
  - From the NOAA-calculated IMH Scenario, the 2060 modeled sea level was chosen. This estimate is the MHHW scenario plus 3.02 feet.

Building Stock Economic Inventory

Hazus general building stock is an inventory of the built environment that is at risk of damage by a hazard. Each respective type or sub-type of building in the following categories; residential, commercial, industrial, agricultural, religious, government, and education has risk based on the replacement value for buildings in that use category, the size and construction of these buildings, and the replacement cost to rebuild if the building is destroyed. For the damage calculations, Hazus assumes that all buildings are evenly distributed throughout a given census block and therefore damage is estimated as a percent and is weighted by the area of inundation at a given depth for a given census block. The methodology therefore, is known as an area-weighted methodology.

FEMA has initiated recent improvements to the area-weighted methodology by further refining the distribution of building square-footage to land areas characterized by development and removing land areas typical of non-developed land classes (e.g., forests, wetlands, etc…). This refinement is called dasymetric mapping and the current Plan modeling utilizes the FEMA dasymetric building stock. The following image shows a small example area in which the developed areas are pink:



Use of the new dasymetric data will typically reduce the total area subject to area-weighted loss estimations - particularly for those census blocks that have flood risk but no actual development within the floodplains. A more detailed explanation is included in the Flood Hazard Analysis section.

The same dasymetric building stock (i.e., square-footage inventory of buildings) that was utilized for the Flood Analysis was also used for Sea Level Rise. All building inventory statistics (i.e., building stock exposure by county or general building type) that were used for the Sea Level Rise Hazus scenarios are the same as defined in the Flood Analysis section. Please refer to the Flood Hazard Analysis section for building stock exposure by county.

Dynamics of exposure (and also loss) are dependent on a number of variables. A key variable, for example, includes the spatial accuracy (30-meter) of the land-use/land-cover data used to create the developed areas of the dasymetric building stock inventory. Another key variable includes the spatial accuracy (i.e., horizontal accuracy) and also the vertical accuracy of the topographic data used to delineate flood inundation areas. Therefore, detailed site analyses may be appropriate and necessary to further understand local dynamics. However, noting the regional nature of the risk assessments performed, a few tables for reference are provided of the Sea Level Rise scenarios to help better understand the dasymetric building stock that is 1.) Potentially exposed and 2.) May experience potential loss. Acreage of developed land intersecting the SLR scenarios is captured in Table 69. Figure 62 shows the dasymetric developed areas intersecting both the MHHW and the IMH Scenarios.

Table 69: Acreage of dasymetric areas (30m developed areas) intersecting SLR scenarios.

MHHW Sea Level Rise Scenario			IMH Sea Level Rise Scenario		
Rank MHHW	*County*	*Acreage of Dasymetric Developed Areas*	*Rank IMH*	*County*	*Acreage of Dasymetric Developed Areas*
1	King William	2,720.84	**1**	King William	4,250.95
2	Essex	2,542.55	**2**	Essex	3,128.68
3	King and Queen	2,155.46	**3**	King and Queen	2,414.11
4	Gloucester	503.76	**4**	Gloucester	1,994.76
5	Middlesex	359.63	**5**	Mathews	1,634.87
6	Mathews	241.91	**6**	Middlesex	562.30
	Total	**8,524.14**		**Total**	**13,985.68**

Figure 62:

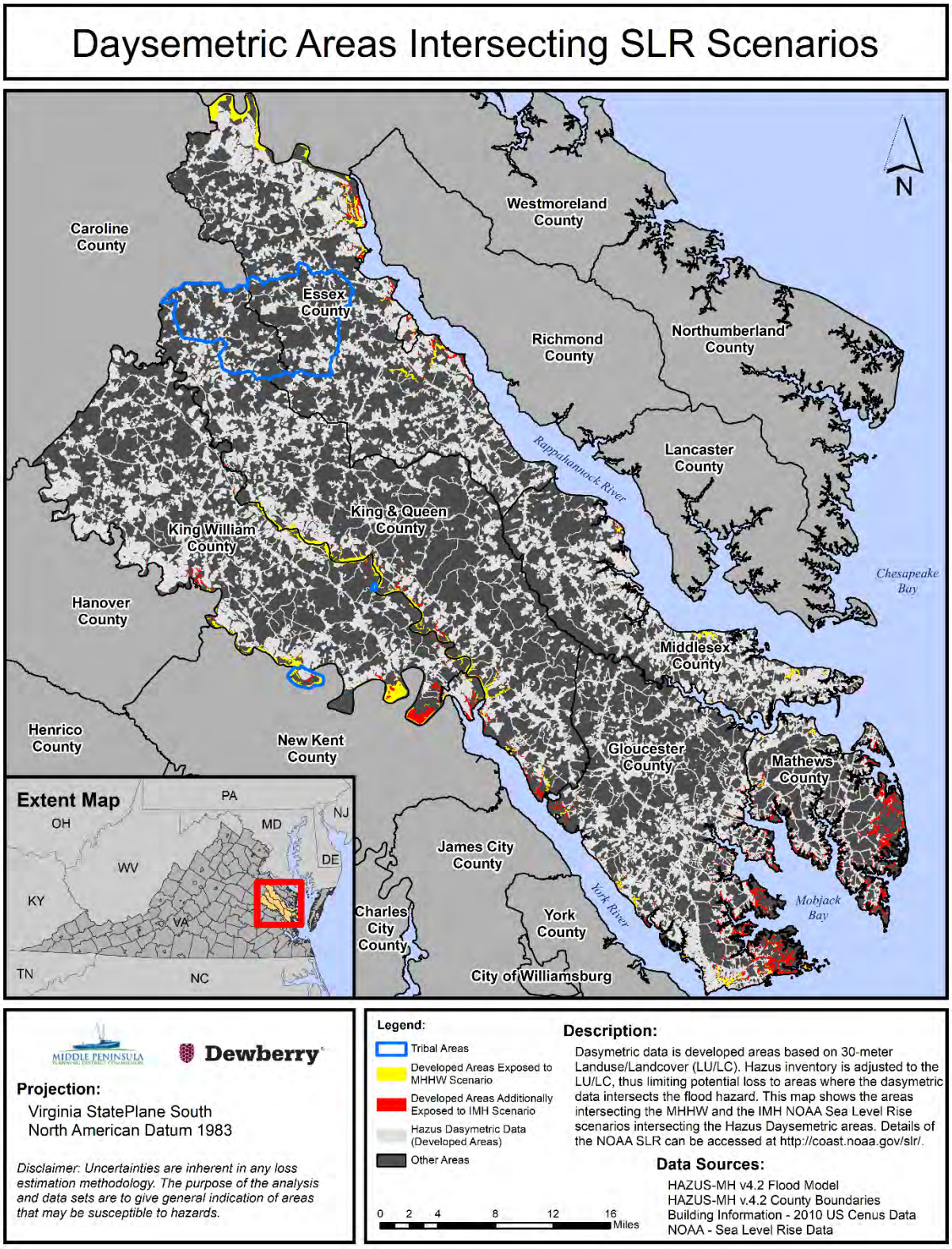

Daysemetric Areas Intersecting SLR Scenarios
N
Caroline County
Essex County
Westmoreland County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Developed Areas Exposed to MHHW Scenario
Developed Areas Additionally Exposed to IMH Scenario
Hazus Dasymetric Data (Developed Areas)
Other Areas
0 2 4 8 12 16 Miles
Description:
Dasymetric data is developed areas based on 30-meter Landuse/Landcover (LU/LC). Hazus inventory is adjusted to the LU/LC, thus limiting potential loss to areas where the dasymetric data intersects the flood hazard. This map shows the areas intersecting the MHHW and the IMH NOAA Sea Level Rise scenarios intersecting the Hazus Daysemetric areas. Details of the NOAA SLR can be accessed at http://coast.noaa.gov/slr/.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Table 70 and Table 71 show the Total Exposure in the Flood Hazard Area of the Hazus Dasymetric Data by General Occupancy Type for both of the Sea Level Rise scenarios.

Table 70: Exposed general occupancy by county – sea level rise MHHW scenario.

County	Residential	Commercial	Industrial	Agriculture	Religion	Govt.	Education	Total
Essex	$4,828	$710	$101	$14	$44	$0	$70	$5,767
Gloucester	$16,424	$1,623	$369	$30	$194	$16	$142	$18,797
King and Queen	$834	$1	$128	$0	$1	$0	$0	$964
King William	$1,887	$241	$79	$9	$3	$0	$0	$2,219
Mathews	$18,105	$960	$213	$89	$94	$30	$41	$19,532
Middlesex	$25,276	$1,182	$320	$28	$290	$16	$21	$27,133
Total	**$67,354**	**$4,718**	**$1,210**	**$169**	**$626**	**$62**	**$274**	**$74,413**
% of Total	91%	6%	2%	< 1%	< 1%	< 1%	< 1%	100%
All values in Thousands of Dollars								

Table 71: Exposed general occupancy by county – sea level rise IMH scenario.

County	Residential	Commercial	Industrial	Agriculture	Religion	Govt.	Education	Total
Essex	$36,351	$7,572	$3,212	$152	$195	$54	$259	$47,794
Gloucester	$199,283	$27,254	$6,197	$738	$3,212	$181	$6,641	$243,507
King and Queen	$9,348	$7	$764	$0	$4	1	$0	$10,123
King William	$27,743	$3,640	$1,017	$34	$459	$$165	$48	$33,107
Mathews	$187,878	$6,074	$8,812	$591	$1,540	$172	$188	$205,255
Middlesex	$68,857	$5,716	$1,130	$76	$890	$71	$125	$76,864
Total	**$529,461**	**$50,263**	**$21,131**	**$1,591**	**$6,299**	**$644**	**$7,260**	**$616,650**
% of Total	86%	8%	3%	< 1%	1%	< 1%	1%	100%
All values in Thousands of Dollars								

Users are encouraged to consider that while one County may have a greater area of developed land intersecting the SLR flood inundation, the square-footage and/or value of structures within the developed areas may have very different value estimates. Consequently, it can be seen that Middlesex County has a great deal of development in close proximity to the MHHW flood hazard – particularly in the Residential category ($67.4 Million). However, as was mentioned earlier, the resolution or spatial accuracy of the 30-meter land-use/land-cover data used to create the dasymetric developed areas does not consider elevation. There are areas within the District that have development on high ground near flooding sources. Middlesex County has a number of these areas. This combination in conjunction with higher residential exposure ($25.3 Million) shows Middlesex as more susceptible to the MHHW Sea Level Rise Scenario.

In contrast, development patterns in the eastern-most portion of Middlesex exhibits development that is set-back away from areas of open and tidal waters – thus exhibiting less exposure to the MHHW SLR Scenario. However, as water levels rise, as would be the case of the IMH Scenario, the development along the low-lying fringes of the coastal plain become more susceptible to the flood hazard and therefore includes a greater proportion of building inventory exposed to the potential rising water levels. The two most eastern counties of Gloucester and Mathews, while they do have development along tidal-influenced waters, they are not within the extent of the MHHW to the same degree as Middlesex, and therefore have less exposure to the MHHW scenario.

General Building Stock Loss Estimation

Losses are presented similar to the Flood Analysis however, only the combined Total losses of all building categories are presented in an effort to keep the results as simple as possible for relative comparison to the more detailed multi-frequency flood analysis. To reiterate, the multi-frequency analysis (Flood Analysis) DOES include water surface levels that consider storm surge.

Hazus Level 1 flood model losses for the Middle Peninsula planning district from the MHHW SLR scenario are approximately $8.9 Million US Dollars and the IMH 2060 scenario are approximately $90.2 Million US Dollars which is a 90% increase in the expected total damages. Property or "capital stock" losses, which includes the values for building, content, and inventory, for the MHHW scenario accounts for 53.8% of the expected loss ($4.8 Million) whereas the IMH 2060 scenario is estimated to be approximately $37.8 Million or 41.9% of the expected loss. Business interruption, which includes relocation, income, rental and wage costs, for the MHHW scenario accounts for $4.1 Million (46.2%) of the expected losses and the IMH 2060 scenario accounts for $52.4 Million US Dollars (57.1%) of the losses.

Table 72 and Table 73 illustrate the expected losses broken down by county from the Sea Level Rise scenarios, while Table 74 breaks out the expected losses for the three Tribal Nations. Middlesex County, having the highest level of estimated exposure ($26.092 Million US Dollars) within the MHHW scenario inundation area, does has the highest loss from the MHHW scenario at $3.0 Million, which accounts for 33.6% of the MHHW losses for the Middle Peninsula[8]. Gloucester County is attributed with 29.8% of total losses at approximately $2.7 Million, and Mathews County has losses of approximately $2.3 Million or 25.4% of the total – followed by Essex (7.3%), King William (3%) and last King and Queen (0.1%). The relatively higher loss percentages attributed to Middlesex, Gloucester, and Mathews counties suggests that the distribution of development at-risk includes the low-lying coastal plains along the Chesapeake and Mobjack Bay as well as the York River.

[8] Readers are reminded due to the regional nature of the analysis; detailed site analyses may be entirely appropriate and necessary to fully understand local dynamics. Especially in areas where development is in close proximity to flooding sources and also marked topographic elevation changes.

The IMH scenario also shows the greater combined losses in the down-east area however, Gloucester and Mathews account for the greatest combined losses (71.3%). Gloucester County has the highest loss from the IMH scenario at approximately $39.0 Million US Dollars, accounting for 43.2% of the total losses for the Middle Peninsula. The IMH scenario shows Mathews County at approximately $25.4 Million and ranked second (28.1%), followed by Middlesex County at approximately $11.3 Million (12.5%), and then Essex (7.6%), King William (7.1%) and last King and Queen (1.5%). Again, the relatively higher loss percentages attributed to Gloucester and Mathews counties suggests that the distribution of development at-risk includes the low-lying coastal plains along the Chesapeake and Mobjack Bay as well as the York River. Figure 65 exemplifies the differences between the inundation extents of the MHHW and IMH scenarios; the mapping of the depth grids represented by red/orange areas are the increased inundation areas of the IMH scenario. Development in these areas would be susceptible to greater potential losses.

The flood model incorporates National Flood Insurance Program (NFIP) entry dates to distinguish Pre-FIRM and Post-FIRM data from the census blocks. Pre-Firm buildings constructed prior to the initial FIRM are considered "pre-FIRM" and those constructed on or after the initial FIRM are considered "post-FIRM". This distinction is important because post-FIRM buildings were built above the base flood elevation (BFE), which makes those buildings less susceptible to flooding. This results in different damage curves between pre- and post-FIRM buildings. If the different curves were not used for these two categories of structures, the results would be skewed and the loss estimates inaccurate. The results provided in this report show the combined total losses for both pre- and post-FIRM values combined.

Table 72: County based Hazus loss for both pre- and post-FIRM – sea level rise MHHW.

County	Building	Content	Inventory	Relocation	Income	Rental	Wage	Total
Essex	$131	$121	$0	$138	$80	$46	$133	$649
Gloucester	$999	$688	$0	$488	$143	$117	$228	$2,663
King and Queen	$37	$21	$1	$22	$0	$4	$0	$85
King William	$59	$43	$0	$40	$50	$11	$65	$268
Mathew	$711	$472	$0	$611	$140	$154	$179	$2,267
Middlesex	$904	$618	$0	$890	$171	$204	$212	$2,999
Total	**$2,841**	**$1,963**	**$1**	**$2,189**	**$584**	**$536**	**$817**	**$8,931**
% of Total	32%	22%	< 1%	25%	6%	6%	8%	100%
All values in Thousands of Dollars								

Table 73: County based Hazus loss for both pre- and post-FIRM – sea level rise IMH.

County	Building	Content	Inventory	Relocation	Income	Rental	Wage	Total
Essex	$1,208	$910	$11	$1,669	$930	$624	$1,506	$6,858
Gloucester	$8,932	$6,345	$26	$9,265	$4,378	$2,781	$7,239	$38,966
King and Queen	$504	$340	$14	$389	$3	$105	$6	$1,361
King William	$1,125	$1,162	$8	$972	$816	$555	$1,761	$6,399
Mathew	$7,303	$4,338	$17	$8,375	$1,148	$2,511	$1,691	$25,383
Middlesex	$3,463	$2,081	$1	$2,752	$955	$840	$1,159	$11,251
Total	**$22,535**	**$15,176**	**$77**	**$23,422**	**$8,230**	**$7,416**	**$13,362**	**$90,218**
% of Total	25%	16%	< 1%	26%	9%	8%	15%	100%
All values in Thousands of Dollars								

Table 74 lists the annualized losses for the Middle Peninsula Tribal Nations. Please note that this data does not include the Upper Mattoponi Tribe; however, the Upper Mattaponi data is included in the County estimations. GIS boundaries were sourced from the "American Indian/Alaska Native/Native Hawaiian Areas" as identified in the 2020 TIGER/Line GIS data, which is publicly available from the U.S. Census Bureau's website. (https://www.census.gov/geographies/mapping-files/time-series/geo/tiger-line-file.html). This website defines Reservation and TDSA areas as:

- *American Indian Reservations: The U.S. Census bureau's boundary files for American Indian reservations are areas with boundaries established by treaty, statute, and/or executive or court order. The reservations and their boundaries are identified for the Census Bureau by the Bureau of Indian Affairs (BIA), an agency in the U.S. Department of the Interior, or by State governments.*

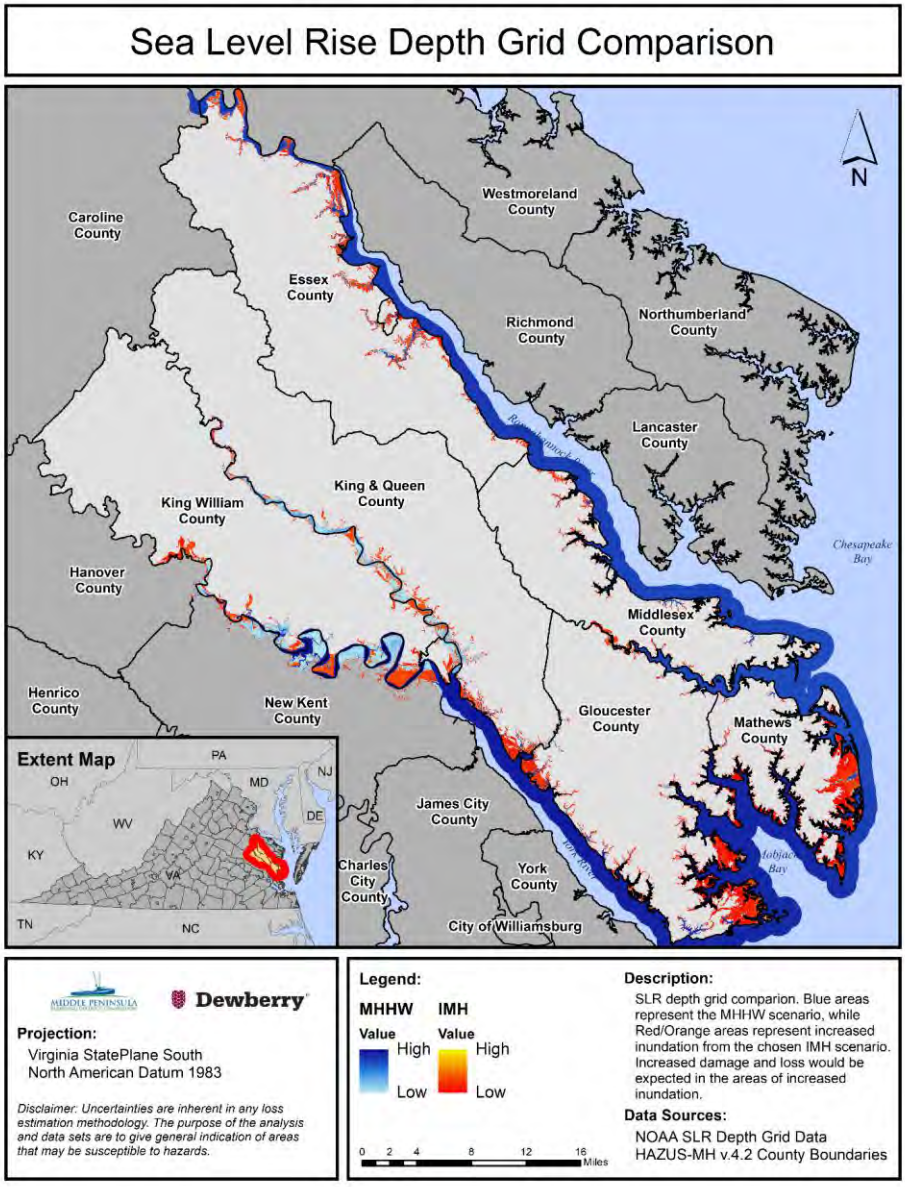
- *Tribal Designated Statistical Areas: the U.S. Census Bureau includes Tribal designated statistical areas that are geographic entities delineated by Federally and State-recognized tribes without a land base, that is, with no reservation or trust lands.* (https://www2.census.gov/geo/pdfs/reference/GARM/Ch5GARM.pdf):

It's important to note that upon correspondences with the Tribes this data does not accurately reflect Tribal lands and will need to be updated for the next update.

Table 74: Tribal Nation based Hazus annualized losses.

Tribal Nation	MHHW Losses	IMH Losses
Mattaponi Indian Reservation	$57,000 (100%)	$90,000 (68%)
Pamunkey Indian Reservation	No Losses	$42,000 (32%)
Rappahannock Tribe's TDSA	No Losses	No Losses
Total Tribal Losses	**$57,000**	**$132,000**

Figure 63:



Figures 64 through 73 on the following pages show the total losses for the planning district for both SLR scenarios and the Ranking of the top ten loss of census blocks (Ranked within each respective County). County-specific maps are shown with the IMH scenario.

Again, users of these maps are reminded that the scenarios shown in the following maps DO NOT include increases to water surface levels from the various natural forces typical of coastal storm events (e.g., Storm Surge). The following results are intended to offer perspective on potential damage/loss in the event that the MHHW surface was to increase by 3.02 feet.

Figure 64:

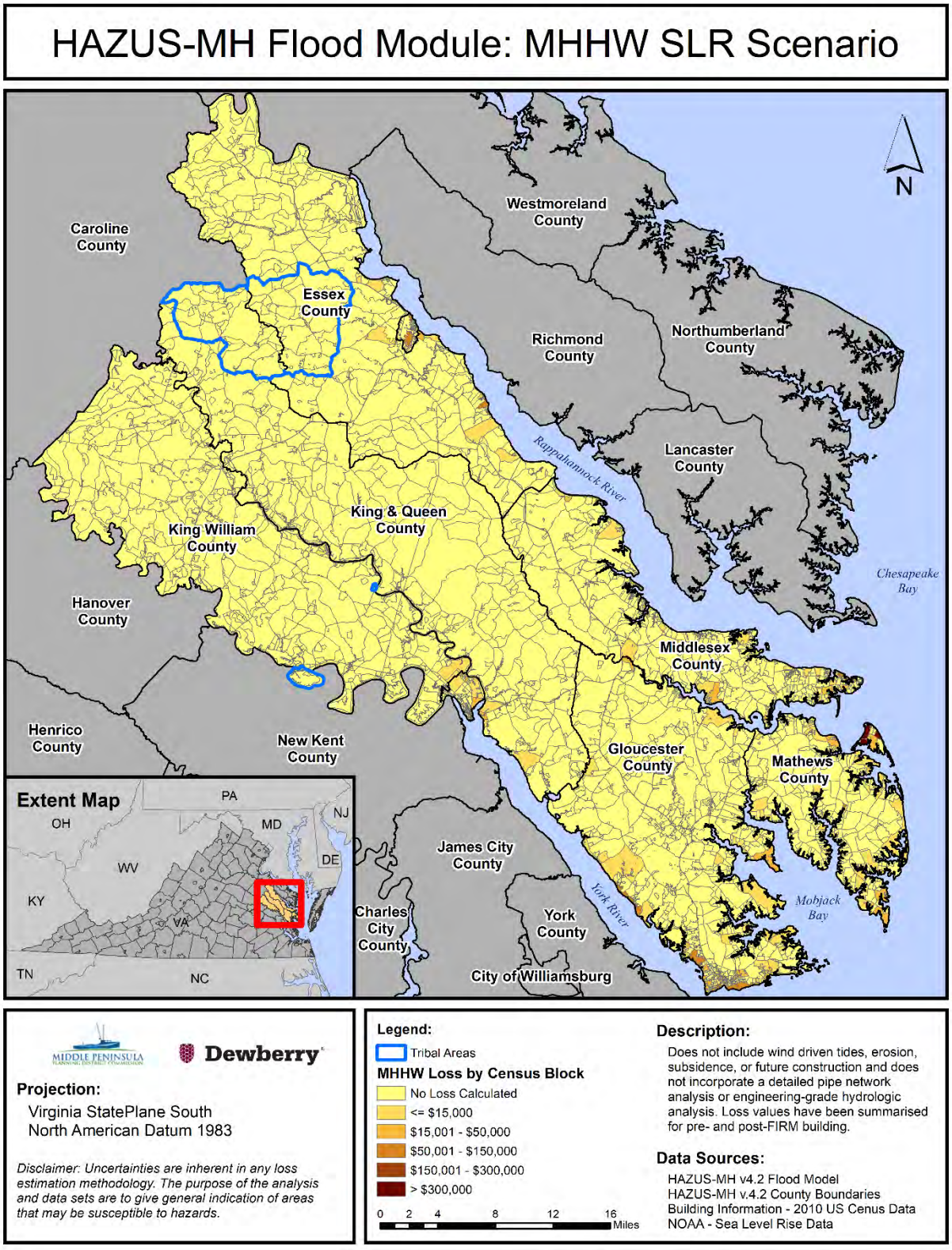

HAZUS-MH Flood Module: MHHW SLR Scenario
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
York River
Mobjack Bay
Charles City County
York County
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
MHHW Loss by Census Block
No Loss Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 2 4 8 12 16
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 65:

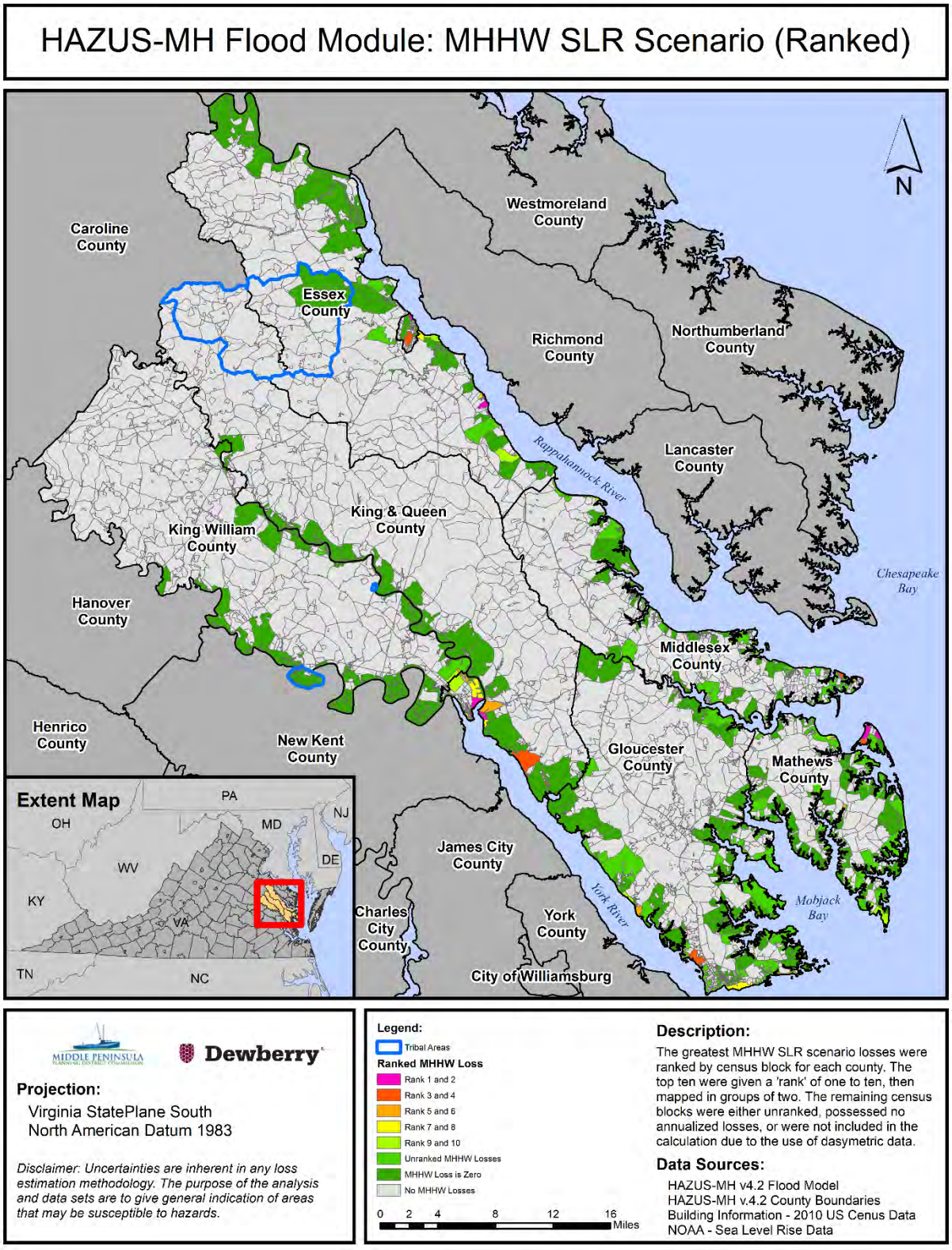

HAZUS-MH Flood Module: MHHW SLR Scenario (Ranked)
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
York River
Mobjack Bay
Charles City County
York County
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Ranked MHHW Loss
Rank 1 and 2
Rank 3 and 4
Rank 5 and 6
Rank 7 and 8
Rank 9 and 10
Unranked MHHW Losses
MHHW Loss is Zero
No MHHW Losses
0 2 4 8 12 16
Miles
Description:
The greatest MHHW SLR scenario losses were ranked by census block for each county. The top ten were given a 'rank' of one to ten, then mapped in groups of two. The remaining census blocks were either unranked, possessed no annualized losses, or were not included in the calculation due to the use of dasymetric data.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 66:

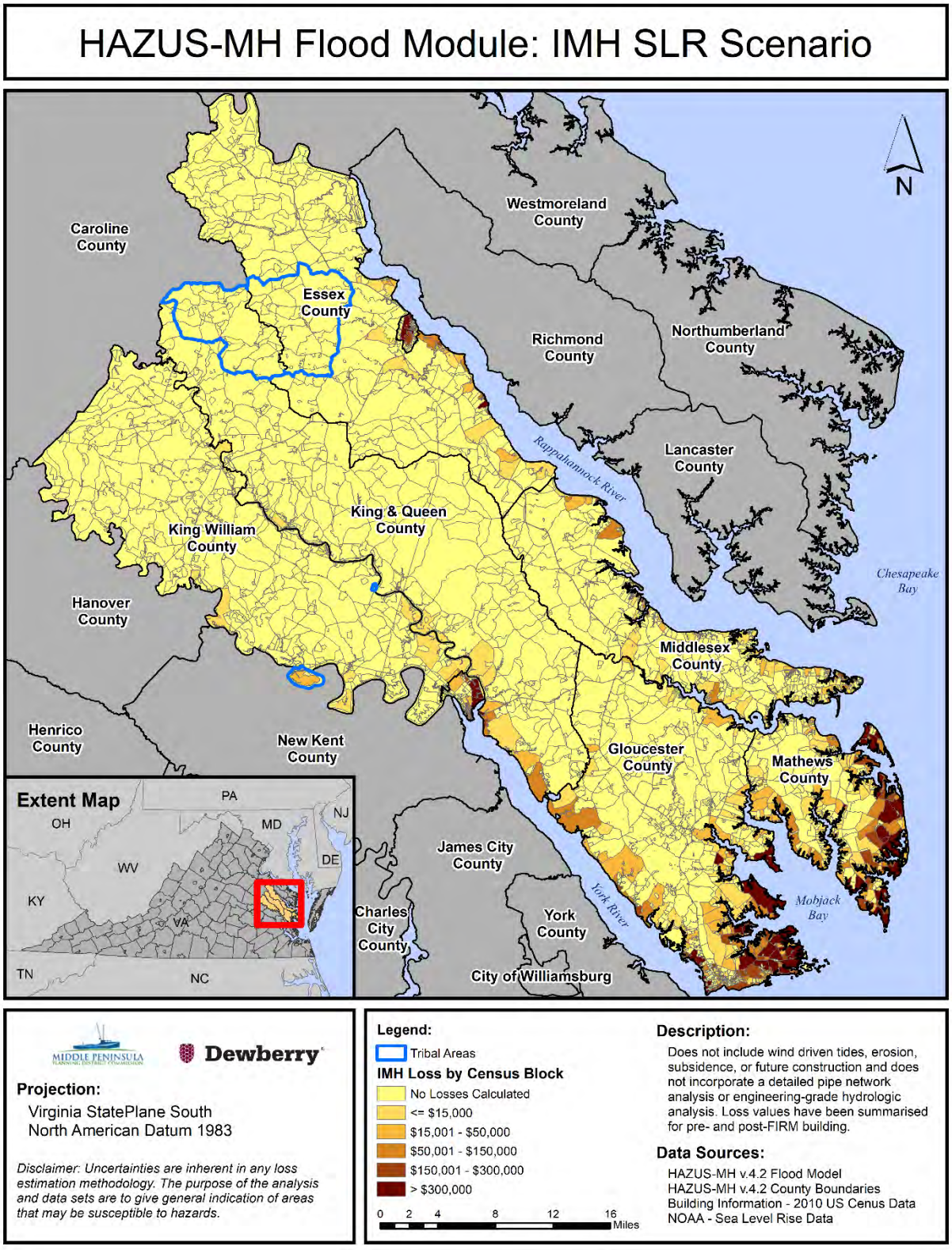

HAZUS-MH Flood Module: IMH SLR Scenario
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
York River
Mobjack Bay
Charles City County
York County
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
MIDDLE PENINSULA PLANNING DISTRICT COMMISSION
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 2 4 8 12 16
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v.4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 67:

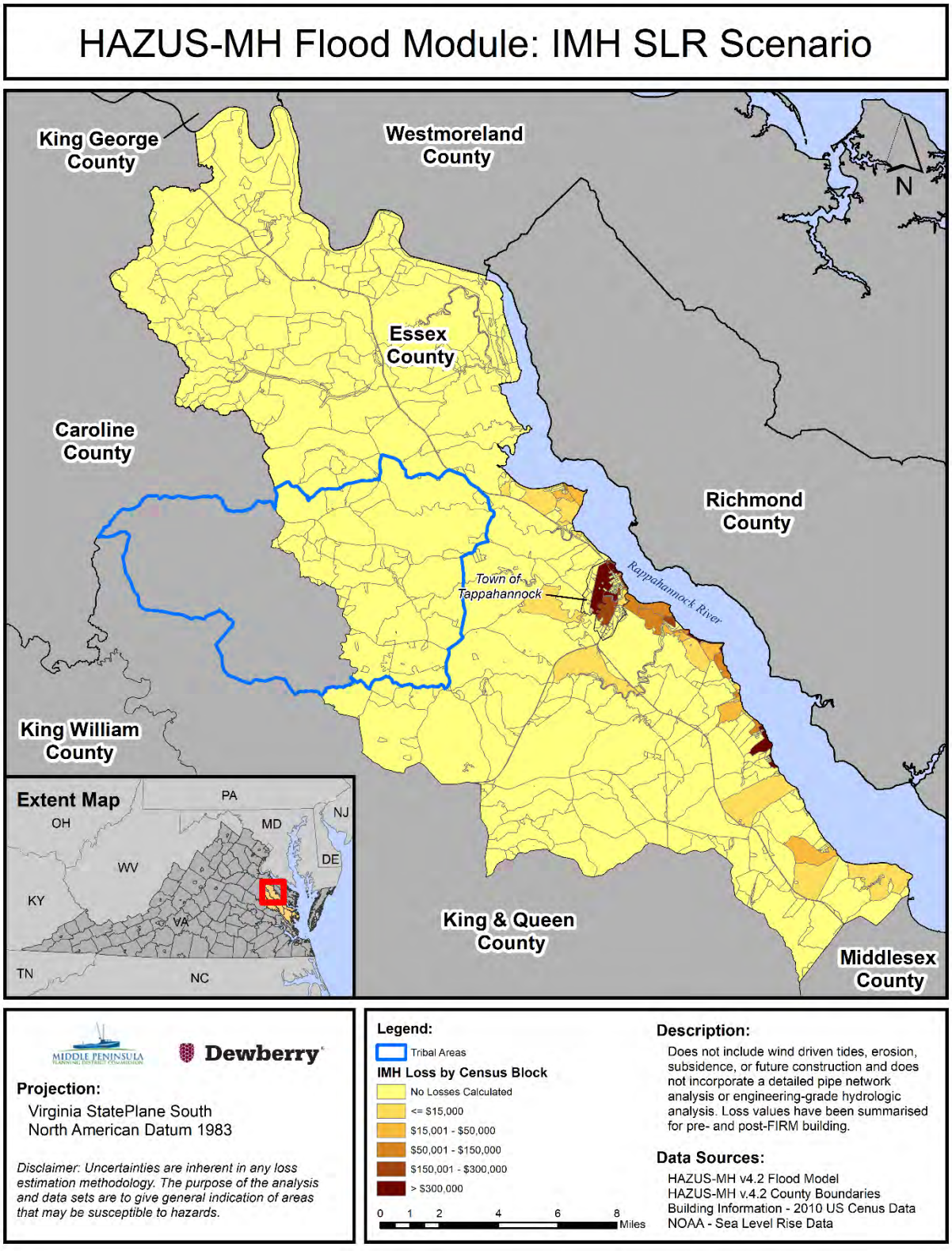

HAZUS-MH Flood Module: IMH SLR Scenario
King George County
Westmoreland County
Essex County
Caroline County
Richmond County
King William County
King & Queen County
Middlesex County
Town of Tappahannock
Rappahannock River
N
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 1 2 4 6 8
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 68:

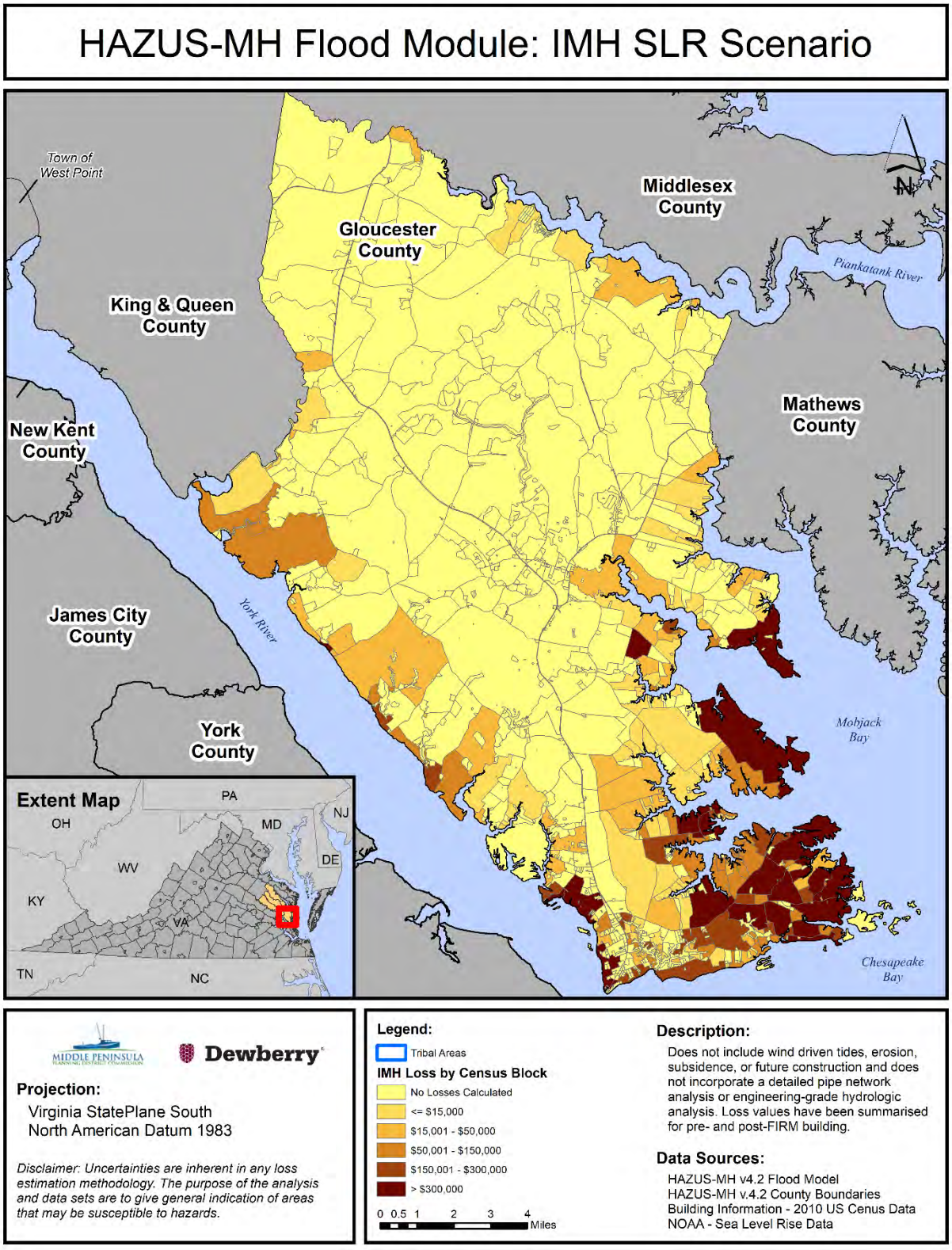

HAZUS-MH Flood Module: IMH SLR Scenario
Town of West Point
Middlesex County
Gloucester County
Pianketank River
King & Queen County
Mathews County
New Kent County
James City County
York River
York County
Mobjack Bay
Chesapeake Bay
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Middle Peninsula Planning District Commission
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 0.5 1 2 3 4
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 69:

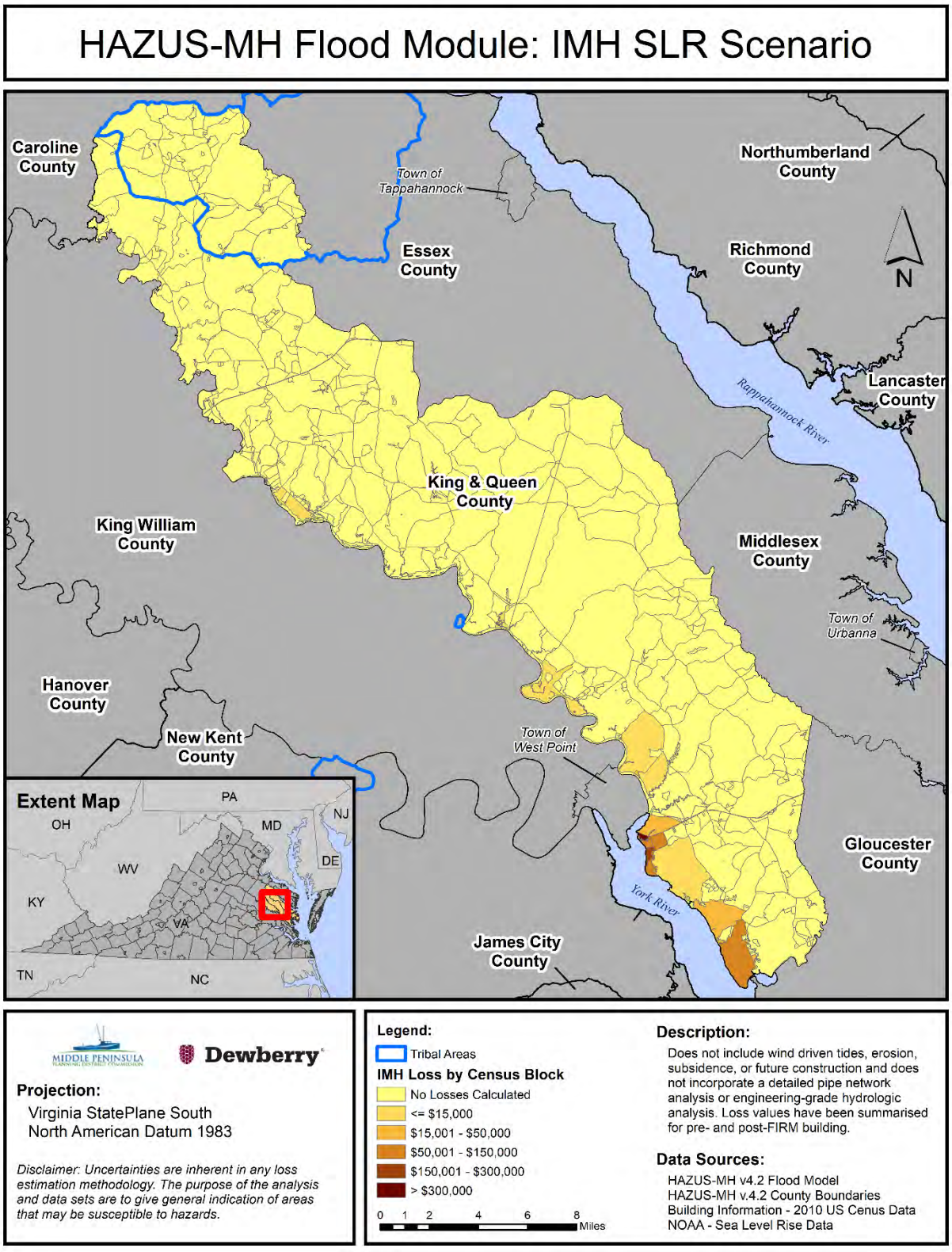

HAZUS-MH Flood Module: IMH SLR Scenario
Caroline County
Town of Tappahannock
Essex County
Northumberland County
Richmond County
N
Rappahannock River
Lancaster County
King & Queen County
King William County
Middlesex County
Town of Urbanna
Hanover County
New Kent County
Town of West Point
Gloucester County
York River
James City County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Middle Peninsula
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 1 2 4 6 8 Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 70:

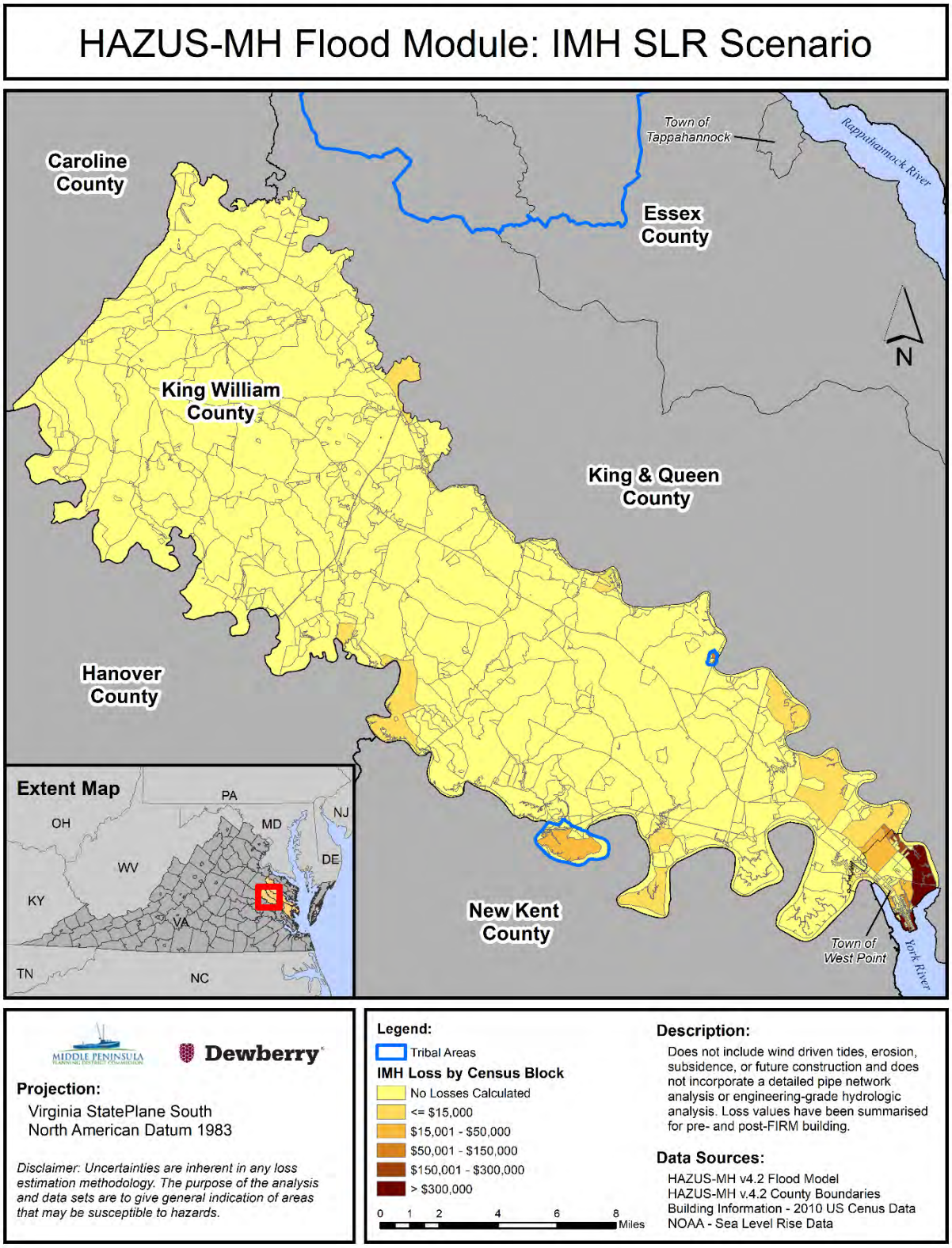

HAZUS-MH Flood Module: IMH SLR Scenario
Caroline County
Town of Tappahannock
Rappahannock River
Essex County
N
King William County
King & Queen County
Hanover County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
New Kent County
Town of West Point
York River
Middle Peninsula Planning District Commission
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 1 2 4 6 8 Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 71:

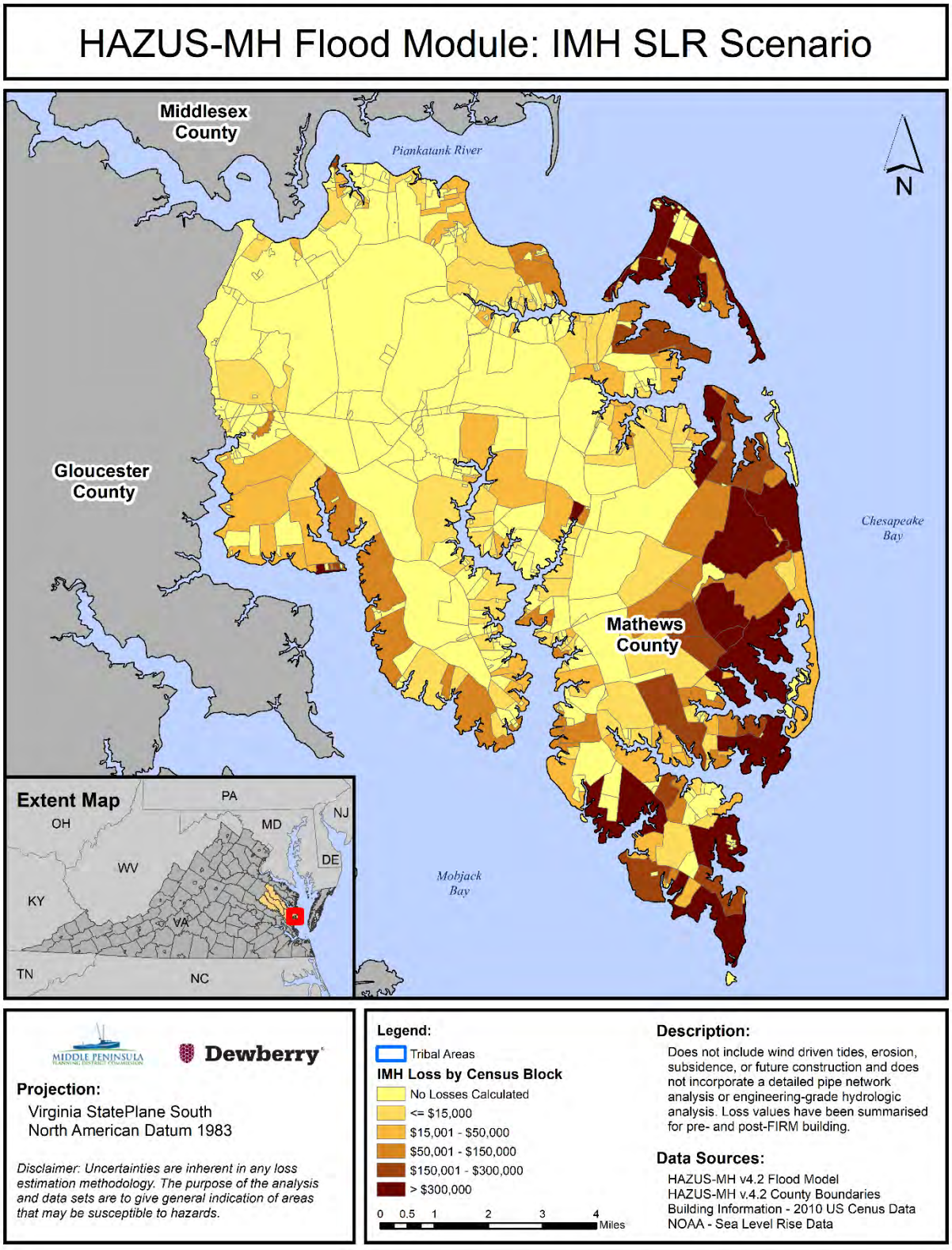

HAZUS-MH Flood Module: IMH SLR Scenario
Middlesex County
Piankatank River
N
Gloucester County
Chesapeake Bay
Mathews County
Mobjack Bay
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Middle Peninsula Planning District Commission
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 0.5 1 2 3 4
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 72:

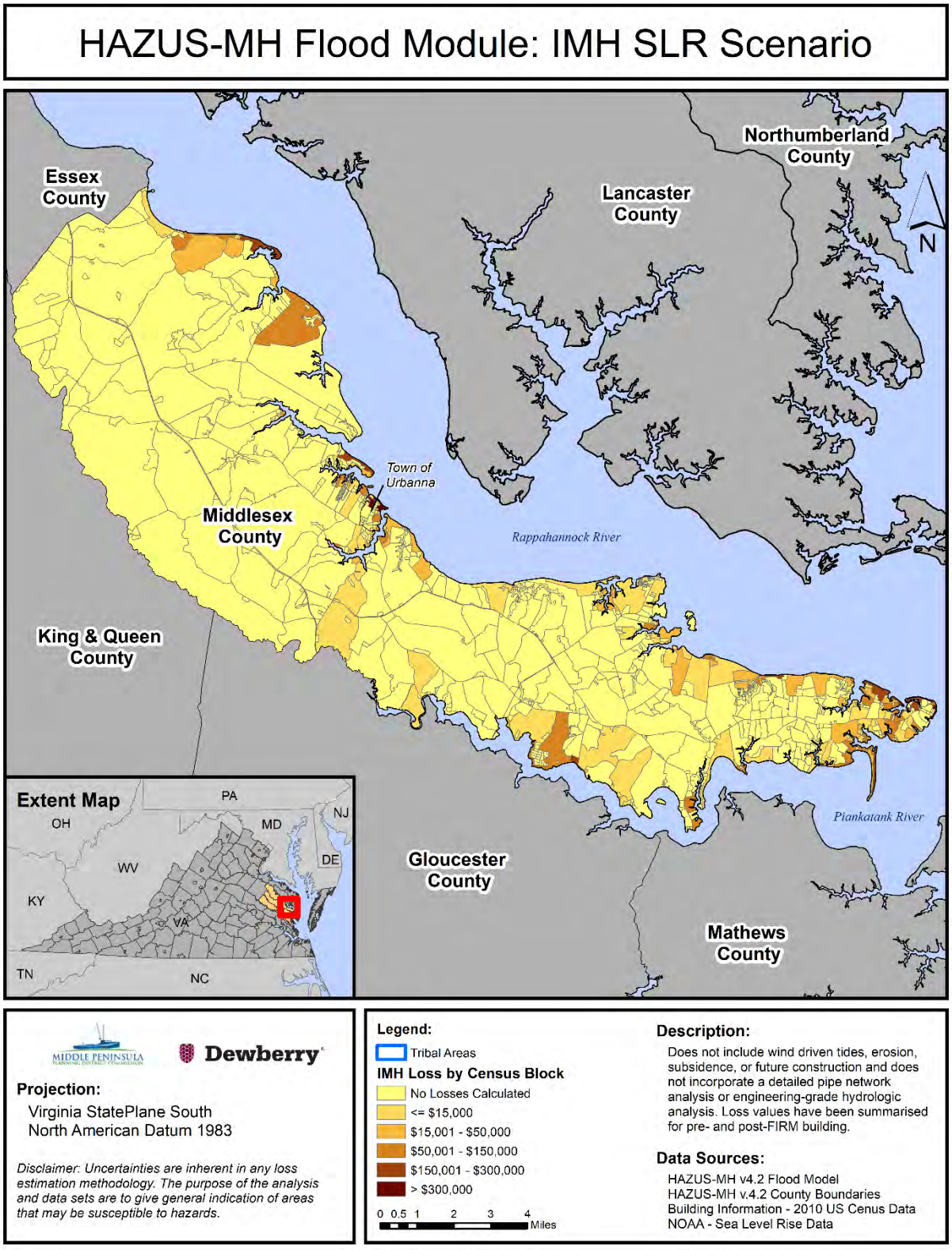

HAZUS-MH Flood Module: IMH SLR Scenario
Essex County
Lancaster County
Northumberland County
N
Town of Urbanna
Middlesex County
Rappahannock River
King & Queen County
Piankatank River
Gloucester County
Mathews County
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
IMH Loss by Census Block
No Losses Calculated
<= $15,000
$15,001 - $50,000
$50,001 - $150,000
$150,001 - $300,000
> $300,000
0 0.5 1 2 3 4
Miles
Description:
Does not include wind driven tides, erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Loss values have been summarised for pre- and post-FIRM building.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Figure 73:

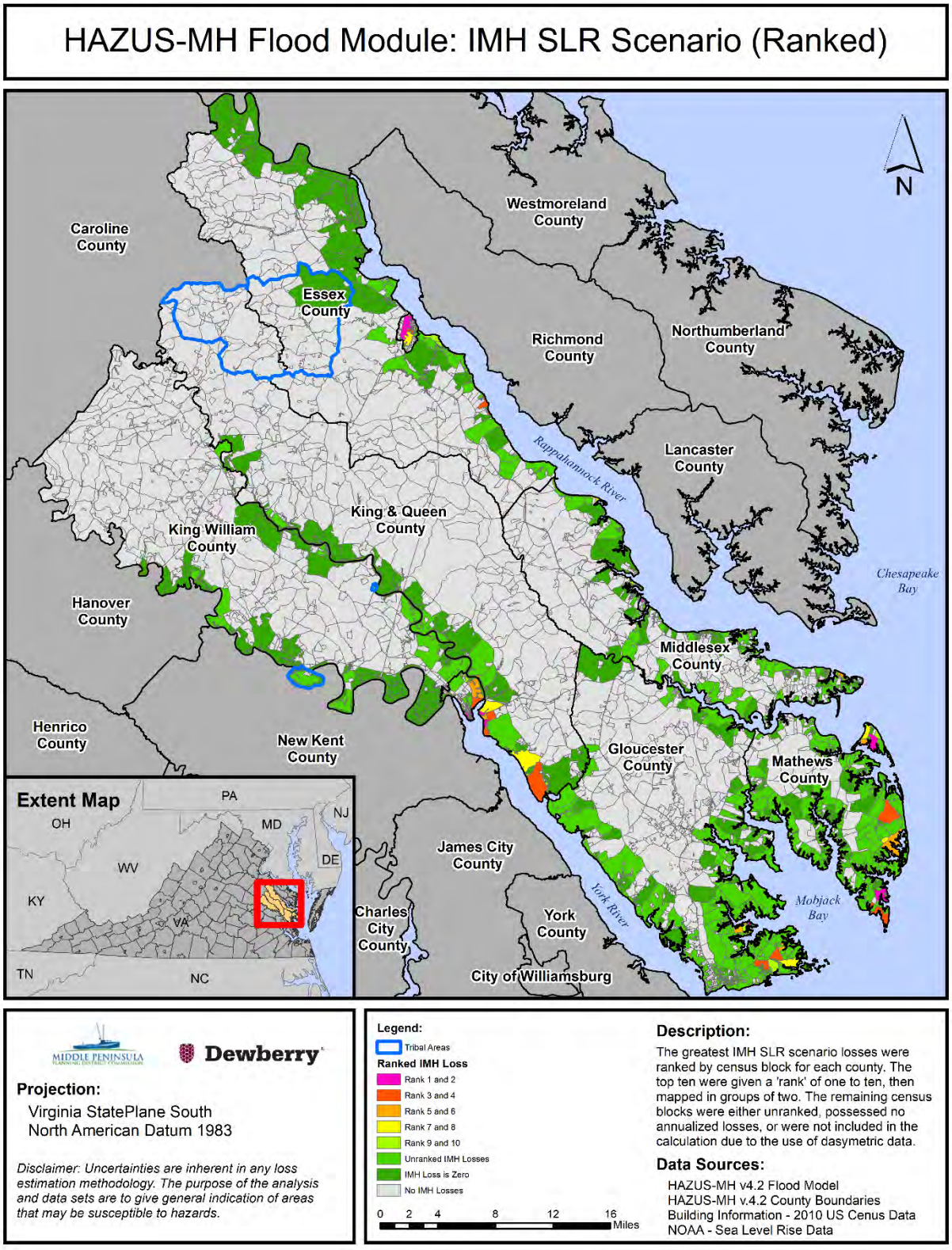

HAZUS-MH Flood Module: IMH SLR Scenario (Ranked)
N
Caroline County
Westmoreland County
Essex County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King & Queen County
King William County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
York River
Mobjack Bay
Charles City County
York County
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Dewberry
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Ranked IMH Loss
Rank 1 and 2
Rank 3 and 4
Rank 5 and 6
Rank 7 and 8
Rank 9 and 10
Unranked IMH Losses
IMH Loss is Zero
No IMH Losses
0 2 4 8 12 16
Miles
Description:
The greatest IMH SLR scenario losses were ranked by census block for each county. The top ten were given a 'rank' of one to ten, then mapped in groups of two. The remaining census blocks were either unranked, possessed no annualized losses, or were not included in the calculation due to the use of dasymetric data.
Data Sources:
HAZUS-MH v4.2 Flood Model
HAZUS-MH v.4.2 County Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Table 75: Hazus loss for both pre- and post- FIRM – MHHW and IMH scenarios.

Area	Scenario [A]	Total Loss	% Total	Building Loss	% Loss	Contents Loss	% Loss	Business [B] Interruption
Middle Peninsula Region	MHHW	$8,931	100%	$2,841	100%	$1,963	100%	$4,126
Middle Peninsula Region	IMH	$90,218	100%	$22,535	100%	$15,176	100%	$52,430
Essex County	MHHW	$649	7%	$131	5%	$121	6%	$397
Essex County	IMH	$6,858	8%	$1,208	5%	$910	6%	$4,729
Gloucester County	MHHW	$2,663	30%	$999	35%	$688	35%	$976
Gloucester County	IMH	$38,966	43%	$8,932	40%	$6,345	42%	$23,663
King and Queen County	MHHW	$85	1%	$37	1%	$21	1%	$26
King and Queen County	IMH	$1,361	2%	$504	2%	$340	2%	$503
King William County	MHHW	$268	3%	$59	2%	$43	2%	$166
King William County	IMH	$6,399	7%	$1,125	5%	$1,162	7%	$4,104
Mathews County	MHHW	$2,267	25%	$711	25%	$472	25%	$1,084
Mathews County	IMH	$25,383	28%	$7,303	32%	$4,338	29%	$13,725
Middlesex County	MHHW	$2,999	34%	$904	32%	$618	31%	$1,477
Middlesex County	IMH	$11,251	12%	$3,463	16%	$2,081	14%	$5,706
Data in Thousands of Dollars								
Notes:								
[A] ***Scenario does not include wind driven tides nor consider natural processes such as erosion, subsidence, or future construction and does not incorporate a detailed pipe network analysis or engineering-grade hydrologic analysis. Details of the SLR analysis performed by NOAA can be accessed at http://coast.noaa.gov/digitalcoast/_/pdf/SLRViewerFAQ.pdf***								
[B] ***Business Interruption = Relocation Cost + Income Loss + Rental Income Loss + Wage Loss***								

Essential Facilities and Loss Estimation

The majority of the region's essential facilities are able to remain functional for both the MHHW and the IMH. Only one essential facility was affected, and only for the IMH. Figure 74 highlights the location of the facility that is damaged by the IMH 2060 scenario – thus experiencing estimated damage and loss. Table 76 lists the damaged essential facilities, the percent-annual-chance event that damaged the facility, it's building and contents losses, and the maximum time to full functionality.

Figure 74:

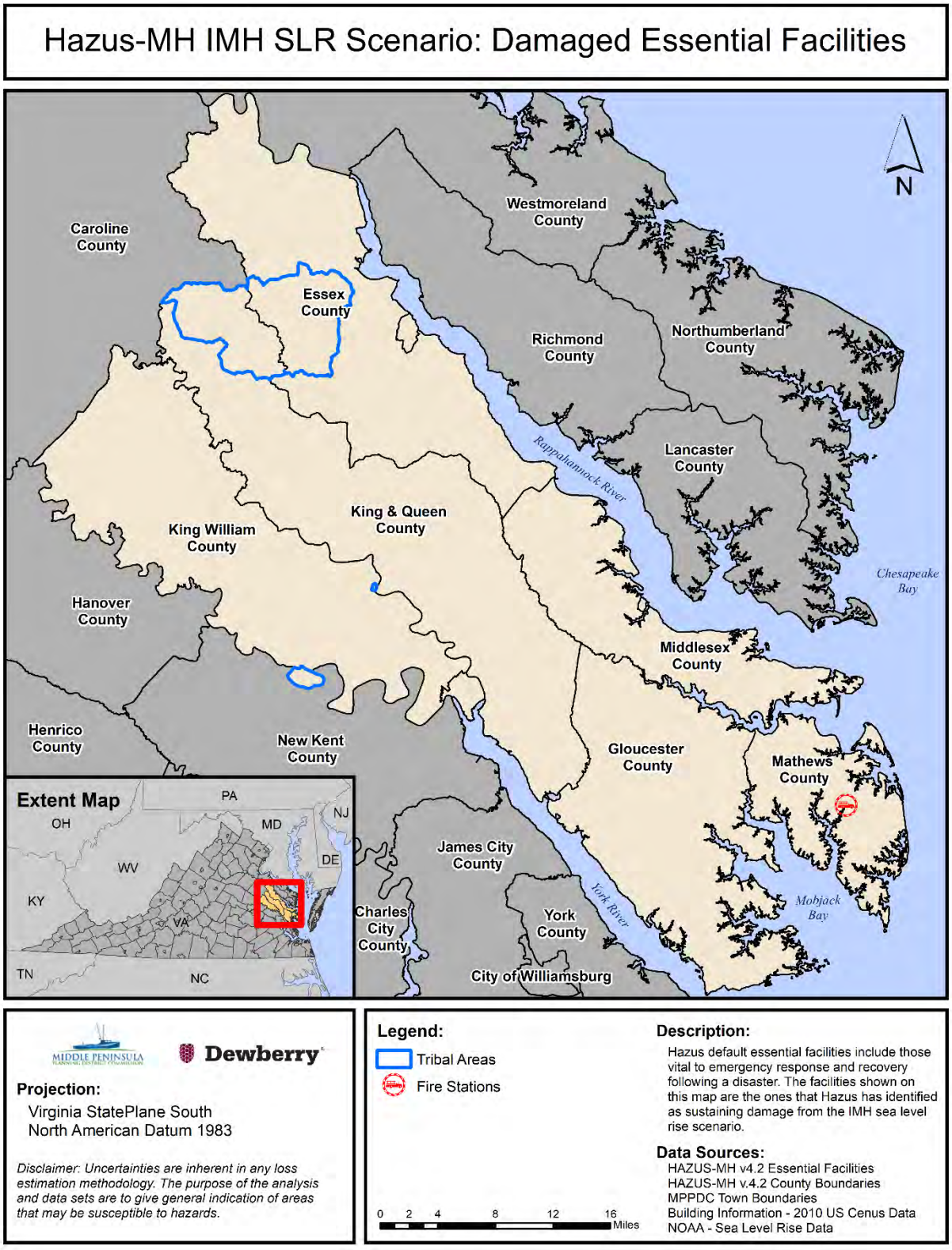

Hazus-MH IMH SLR Scenario: Damaged Essential Facilities
N
Caroline County
Essex County
Westmoreland County
Richmond County
Northumberland County
Lancaster County
Rappahannock River
King William County
King & Queen County
Hanover County
Chesapeake Bay
Middlesex County
Henrico County
New Kent County
Gloucester County
Mathews County
James City County
Charles City County
York County
York River
Mobjack Bay
City of Williamsburg
Extent Map
PA
NJ
OH
MD
DE
WV
KY
VA
TN
NC
Projection:
Virginia StatePlane South
North American Datum 1983
Disclaimer: Uncertainties are inherent in any loss estimation methodology. The purpose of the analysis and data sets are to give general indication of areas that may be susceptible to hazards.
Legend:
Tribal Areas
Fire Stations
0 2 4 8 12 16
Miles
Description:
Hazus default essential facilities include those vital to emergency response and recovery following a disaster. The facilities shown on this map are the ones that Hazus has identified as sustaining damage from the IMH sea level rise scenario.
Data Sources:
HAZUS-MH v4.2 Essential Facilities
HAZUS-MH v.4.2 County Boundaries
MPPDC Town Boundaries
Building Information - 2010 US Census Data
NOAA - Sea Level Rise Data

Table 76: Damages to essential facilities.

Name	City	Scenario	Flood Hazard	Building DmgPct	Building Losses	Contents DmgPct	Content Losses	MaxTime to Full Restoration
Mathews Volunteer Fire Department Incorporated Station 1	Mathews	IMH	SLR	1.43%	$36.02	1.64%	$61.75	480

Note: No essential facilities had any calculated damage for the MHHW scenario.

Potential Mitigation Actions

The potential mitigation actions noted are those that are Hazus-specific and would benefit refinement of Hazus analyses.

- ☐ Perform Hazus analyses based on the same data resources used to develop the inundation areas mapped in the report submitted to the Virginia General Assembly in January 2013 titled – RECURRENT FLOODING STUDY FOR TIDEWATER VIRGINIA by the Virginia Institute of Marine Science, Center for Coastal Resources Management at the College of William & Mary. This study appears to include the most widely accepted Sea Level Rise plus Storm Surge Scenario facing coastal Virginia. It would therefore be appropriate to consider 1.) The creation of depth grids from the study data and then 2.) Hazus Risk Assessment. It would also be beneficial to incorporate elements of the design storm into a combined Hazus Flood and Hurricane Scenario - in this manner benefits of the combined methodology can be realized – which includes methods to guard against over-counting or double-counting losses by simply adding damages from each respective Hazus model.
- ☐ Refine and update data sets for GBS and essential facilities.
    - o Improvements in the future should aim to further refine the building stock. Notably, one improvement should include adding any new development that may not have been in the land use/land cover data; e.g., new housing developments, new construction, etc…
    - o Perform localized building-level assessments in known areas of loss and or areas subject to likely losses.
- ☐ Improve Data associated with the federally recognized tribes.

Section 6 - Capability Assessment

According to the FEMA Local Mitigation Planning Handbook, *Each community has a unique set of capabilities, including authorities, policies, programs, staff, funding another resources available to accomplish mitigation and reduce long-term vulnerability.* In an effort to assess these capabilities within each Middle Peninsula locality and tribe the regional planner worked with the LPT to gather the necessary information. To provide consistency amongst the localities, the regional planner provided each locality with a Capability Assessment Worksheet to fill out. This work sheet requested feedback on the primary types of capabilities for reducing long-term vulnerability including planning and regulatory, administrative, and technical, financial, and education and outreach.

While each locality and tribe have a variety of tools (i.e. authorities, polices, programs, staff, and funding sources) to implement mitigation goals, objectives, and strategies, each locality and tribe functions differently and therefore has a different capacity to implement tools. Below is a breakdown of the capabilities within in each jurisdiction as it relates to planning and regulatory, administrative, and technical, financial, and education and outreach.

Planning and regulatory capabilities are the plans, policies, codes, and ordinances that prevent and reduce the impacts of hazards. Table 77 shows the types of plans within each Middle Peninsula locality and tribe. This table also identifies, in green, those plans that address hazards to some degree.

Table 77: This a summary table of the plans that are implemented within their locality. The green squares indicate that plans within the localities that address hazards.

Plans	Essex	Gloucester	King & Queen	King William	Mathews	Middlesex	Town of Tappahannock	Town of Urbanna	Town of West Point	Rappahannock Tribe	Upper Mattaponi Tribe
Comprehensive Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Capital Improvements Plan	Yes	Yes	Yes	Yes	Yes	Yes	No	Yes	No	No	No
Economic Development Plan	Yes	Yes	Yes	No	No	Yes	No	Yes	No	In-Progress	No
Local Emergency Operations Plan	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	In-Progress	No**
Continuity of Operations Plan		In Progress		No	In-Progress	Yes	No	No	Yes	In-Progress	No**
Transportation Plan	Yes	No	Yes	Yes	Yes	No	No	No	No	No	No
Stormwater Management Plan	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes	No	No	No
Community Wildfire Protection Plan		No	No	No	No	No	No	No	No	No	No
Other special plans (e.g. Brownfield's redevelopment, disaster recovery, coastal zone management, climate change adaptation)		Yes	Yes	No	No	No	No		No	No	No**

**Note: Each locality and tribe had the opportunity to provide responses to available capabilities. Therefore, empty squares represent no response from the locality.*
***The Upper Mattaponi Tribe has recently hired an Emergency Management Coordinator and plans are started to meet this requirement. Also the UMT is in the process of developing a Climate Vulnerability Assessment.*

Table 78: ESSEX COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)		1. Yes 2. Yes
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	Yes	Landuse, parks and recreation

Table 79: GLOUCESTER COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	1. Yes 2. Yes
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	Yes	1. Yes 2. Yes
Other	Yes	1. Yes 2. Yes

Table 80: KING & QUEEN COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	1. Requires open space, flood elevation certificates, substantial setback requirements, etc. 2. yes
Subdivision ordinance	Yes	1. Allows for limited number of by-right divisions compared to surrounding jurisdictions. Site plan requirements. 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	1. Stormwater – limits development 2. Yes - DEQ
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	Yes	Conservation Easements & DOF Public Forest

Table 81: KING WILLIAM COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	Yes
Subdivision ordinance	Yes	
Floodplain ordinance	Yes	
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	Stormwater Ordinance Drought Ordinance
Flood insurance rate maps	Yes	
Acquisition of land for open space and public recreation uses	No	

Table 82: MATHEWS COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinance adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	
Flood insurance rate maps	Yes	1. Yes, effective date 12/09/14 2. Yes
Acquisition of land for open space and public recreation uses	Yes	Only through FEMA HMGP Grant funding

How can these capabilities be expanded and improved to reduce risk?

- The Comprehensive Plan will be reviewed this year and into 2016 for potential amendments to identify future land uses for flood prone areas of the county and to adopt ordinances /policies that will reduce risks from recurrent flooding.
- We will consider land use tools such as increased setbacks and increased minimum lot sizes in the zoning ordinance and reducing the number of lots that can be created through subdivision of land to reduce development areas of land in the county subject to flooding.
- We will consider tools such as Purchase of Development Rights and Transfer of Development Rights to be included in our County Code of Ordinances to provide incentives to property owners/developers to develop outside of flood prone areas.
- We will review the Capital Improvements Plan to identify County-owned buildings/facilities that could be flood proofed or developed outside of Special Flood Hazard Areas.
- The Floodplain Management Ordinance could be expanded to identify a freeboard requirement for elevation of structures above the base flood elevation (BFE).

Table 83: MIDDLESEX COUNTY		
Land Use Planning and Ordinances	**Yes/No**	**1. Is the ordinance an effective measure for reducing hazard impacts? 2. Is the ordinance adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	1. Yes 2. Yes
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	No	

Table 84: TOWN OF URBANNA		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	1. Yes 2. Yes
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	No	N/A

Table 85: TOWN OF TAPPAHANNOCK		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes/2004	1. Yes 2. Yes
Subdivision ordinance	Yes/1999	1. Yes 2. Yes
Floodplain ordinance	Yes/2015	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes/2011	1. Yes 2. Yes
Flood insurance rate maps	Yes/2015	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	Yes	1. Yes 2. Yes

Table 86: TOWN OF WEST POINT		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinances adequately administered and enforced?**
Zoning ordinance	Yes	1. Yes 2. Yes
Subdivision ordinance	Yes	1. Yes 2. Yes
Floodplain ordinance	Yes	1. Yes 2. Yes
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	Yes	1. Yes 2. Yes
Flood insurance rate maps	Yes	1. Yes 2. Yes
Acquisition of land for open space and public recreation uses	Yes	1. Yes 2. Yes

Table 87: RAPPAHANNOCK TRIBE		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinances adequately administered and enforced?**
Zoning ordinance	No	1. NA 2. NA
Subdivision ordinance	No	1. NA 2. NA
Floodplain ordinance	No	1. NA 2. NA
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	1. NA 2. NA
Flood insurance rate maps	No	1. NA 2. NA
Acquisition of land for open space and public recreation uses	No	1. NA 2. NA
How can these capabilities be expanded and improved to reduce risk?		
The Rappahannock Tribal Center is in King & Queen County. The Tribe operates within the program parameters and guidelines established by the four counties that make up our Rappahannock Tribe Service Area (RTSA) of King & Queen, King William, Essex, and Caroline Counties. Although the Tribe currently and largely relies on the emergency services provided by our four-county emergency service agencies, the Rappahannock Tribe has recently launched its own Emergency Management department and is currently in the process of developing our preparedness plans and resources.		

Table 88: UPPER MATTAPONI TRIBE		
Land Use Planning and Ordinances	**Yes/No**	**Is the ordinance an effective measure for reducing hazard impacts? Is the ordinances adequately administered and enforced?**
Zoning ordinance	No	1. NA 2. NA
Subdivision ordinance	No	1. NA 2. NA
Floodplain ordinance	No	1. NA 2. NA
Natural hazard specific ordinance (stormwater, steep slope, wildfire)	No	1. NA 2. NA
Flood insurance rate maps	No	1. NA 2. NA
Acquisition of land for open space and public recreation uses	No	1. NA 2. NA
How can these capabilities be expanded and improved to reduce risk?		
Currently in capacity building stage, need additional support to create planning and ordinances.		

Administrative and technical capabilities include tools, staff and their skills that can be used for mitigation planning and to implement specific mitigation actions. For smaller jurisdictions without staff resources, enforcing policies, or conducting public outreach may be difficult. Table 89 below indicates whether Middle Peninsula localities and tribes have specific administrative and technical capabilities.

Table 89: This table indicates whether Middle Peninsula localities and tribes have specific administrative, staff, and technical capabilities.											
Administration	**Essex**	**Gloucester**	**King & Queen**	**King William**	**Mathews**	**Middlesex**	**Town of Tappahannock**	**Town of Urbanna**	**Town of West Point**	**Rappahannock Tribe**	**Upper Mattaponi Tribe**
Planning Commission	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Mitigation Planning Committee	No	Yes	No	No	No	No	No	No	No	No	No
Maintenance programs to reduce risk (e.g., tree trimming, clearing drainage systems)	Yes	Yes	Yes	No	Yes, Outfall Ditch Program	No	No	No	No	No	No
Mutual aid agreements	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Staff											
Chief Building Official	Yes	Yes	Yes *(Full-time)*	Yes	Yes *(Full-time)*	Yes	Yes	Yes	Yes *(Full-time)*	No	No
Floodplain Administrator	Yes	Yes	Yes	Yes	Yes *(Full-time)*	Yes	Yes	Yes	Yes *(Full-time)*	No	No
Emergency Manager	Yes	Yes	Yes	Yes	Yes *(Full-time)*	Yes	Yes	Yes	Yes *(Full-time)*	Yes *(full-time)*	Yes *(full-time)*
Community Planner	Yes	Yes	Yes	Yes	Yes *(Full-time)*	No	Yes	Yes	Yes *(Full-time)*	No	No
Civil Engineer	No	Yes	No	No	No	No	No	No	Yes *(part-time)*	No	No
GIS Coordinator	No	Yes	Yes	Yes	Yes *(Full-time)*	Yes	No	Yes	Yes *(Full-time)*	No	No
Other				Yes	Yes *(Full-time)*						No
Technical											
Warning systems/services (Reverse 911, outdoor warning signals)		Yes		Yes	Yes	Yes	No	Yes	Yes	No	No
Hazard data and information	No	Yes				Yes	No	Yes	Yes	No	No
Grant Writing	Yes *(Part-Time)*	No	Yes *(Part-Time)*	Yes	Yes	Yes	No	Yes	Yes	Yes, one staff member working on Grants	No
Hazus analysis	No	No	No	No	No	No	No	Yes	Yes	No	No
**Note: Each locality and Tribe had the opportunity to provide responses to available capabilities. Therefore, empty squares represent no response from the jurisdiction.*											

Essex County has tree trimming maintenance program with the local electric company helps to reduce risk of power outages. As for the Town of Tappahannock they have access to and benefit from the Chief Building Official, Floodplain Administrator, and Emergency Manger that is employed with Essex County.

Gloucester County identified that staffing within the County is not adequate to proactively enforce regulations, however all staff are trained on hazards and mitigation and that there is coordination between agencies, staff and committees. Gloucester County has a County Hazard Mitigation Committee that meets monthly and aggressively addresses homes in the flood risk zones with FEMA's Hazard Mitigation Grant Program (HMGP) to perform property elevations. The County also works with Dominion Energy for tree trimming maintenance program to reduce risk of power outages.

As the Town of Urbanna is a small coastal community, resources are limited and, in many cases, shared with the Middlesex County. While the Town of Urbanna has access to a Chief Building Official, Floodplain Administrator, Emergency Manger, and a GIS coordinator, Middlesex County employees these people. In addition, the Town of Urbanna benefits from Middlesex County's fire and emergency medical service mutual aid agreements as well as the County's Blackboard connect and Reverse 911 system. Urbanna's Economic Development Plan and Emergency Operations Plans are incorporated into the Middlesex County Plan.

King William County has adequate staffing throughout the county, but identified that the Chief Building Official, Floodplain Administrator, Community Planner, and GIS coordinator are not trained in hazards and mitigation. As for the Town of West Point, it operates separately from the County and only benefits from the King William County warning system in place. Therefore, the Town has full-time staffers, with the exception of the civil engineer, that help to adequately to enforce regulations, however the majority of them are not trained on hazards and mitigation (i.e., Chief Building Official, Floodplain administrator, Community planning and the GIS coordinator).

Mathews County identified that while County positions are filled full time positions Chief Building Official, and the Floodplain Administrator are not staffed adequately. There is more work than staff hours can handle. However, each staffer noted in the above table are trained on hazards and mitigation.

The Rappahannock Tribe operates within the program parameters and guidelines established by the four counties that make up our Rappahannock Tribe Service Area (RTSA) of King & Queen, King William, Essex, and Caroline Counties; however, since the Tribe became federally recognized the Tribe is working on developing programs, mutual aid agreements, and technical resources. The Tribe is currently researching Code Red, Everbridge, and other alert systems and seeking grant funding for such services.

The Upper Mattaponi Indian Tribe is currently in the capacity building stage, and actively working on hiring staff in various roles. The Tribe is investigating advanced hazard warning systems, and until a system can be implemented, tribal citizens can utilize the system utilized by their specific locality. The Tribe is also working on developing programs, ordinances, agreements, and technical resources.

In addition to locality specific capabilities, all Middle Peninsula localities are active members of the Middle Peninsula Planning District Commission (MPPDC). The MPPDC is a regional planning body that can assist localities in grant writing, technical assistance, and executing a project. Depending on the need of the locality or the region, MPPDC staff may assist. For instance, through this AHMP update MPPDC hired a planner to coordinate localities and Tribes to update the AHMP. In part, the Hazus analysis was conducted for all localities and the Tribal Designated Statistical Areas (TDSA), as defined by the US Census, associated with the three federally recognized tribes in the Middle Peninsula region to estimate

potential losses from hurricane winds, flooding and sea level rise. Please see Section 5 for the full Hazus analysis.

Financial capabilities address a jurisdiction's access to or eligibility to use the following funding resources for hazard mitigation. Table 90 below indicates the specific financial capabilities of the localities and tribes in the region.

Table 90: This table indicates whether Middle Peninsula localities and Tribes have specific financial capabilities.											
Plans	**Essex**	**Gloucester**	**King & Queen**	**King William**	**Mathews**	**Middlesex**	**Town of Tappahannock**	**Town of Urbanna**	**Town of West Point**	**Rappahannock Tribe**	**Upper Mattaponi Tribe**
Capital Improvement Project funding	Yes	Yes	Yes	Yes	Yes	No	Yes	Yes/ Eligible	No	Yes	Yes
Authority to levy taxes for specific purposes	No	Yes	Yes	Yes	No	No	No	No	No	No	
Fees for water, sewer, gas, or electric services	No	Yes	No	No	No	No	No	Yes- *Water Only*	No	No	No
Impact fees for new development	No	No	No	No	No	No	No	No	No	No	No
Storm water utility fee	No	Yes	No	No	No	No	No	No	No	No	No
Incur debt through general obligation bonds and /or special tax bonds	No	Yes	No	Yes	Yes	No	No	No	No	No	Yes
Incur debt through private activities	Yes	Yes	No	Yes	No	No	No	No	No	No	Yes
Community Development Block Grant	No	No		Yes	Yes	No	No	No	No	No	Yes
Other federal funding programs	No	Yes		Yes	Yes	Yes	Yes	Yes	Yes	Yes, *Researching options*	Yes
State funding programs	No	Yes	Yes	Yes	No	Yes	Yes	Yes	No	Yes, *Researching options*	Yes
**Note: Each locality and Tribe had the opportunity to provide responses to available capabilities. Therefore, empty squares represent no response from the locality.*											

While some financial options are available to localities and tribes, there are some cases in which these resources may not be used to address mitigation. For instance, Essex County could use the CIP to fund mitigation however there is currently no dedicated funds for this effort. If there were CIP could be used for a variety of planning efforts and providing local grant incentives and hazard mitigation work on private properties. According to Gloucester County it has access to stormwater utility fees, incurred debt through general obligation bonds and /or special tax bonds, and debt through private activities and yet Gloucester County cannot utilize these resources specifically for mitigation purposes. For King William County those funding resources identified as "not being used in the past and therefore are not likely to be used in the future" include Authority to levy taxes for specific purposes and incurring debt through private activities. However, King William County also noted funding resources identified as "not being used in the past but could be in the future" to include capital improvement project funding, community development block grant, other funding programs, and state funded programs as well as incurring debt through general obligation bonds and/or special tax bonds.

The Town of Urbanna noted that while it has access to the community development block grants, other federal funding programs and state funding program these programs have not been used locally in the past and they have limited potential to be used in the future due to income eligibility.

Mathews County has utilized the Community Development Block Grant and received for a business District Revitalization project. While this project was not associated with hazard mitigation, Mathews County could use this funding for future hazard mitigation activities. In additional Mathews County has also received funding from the FEMA's HMGP Program to elevate houses and acquire properties in Special Flood Hazard Areas. The County plans to apply for additional funding from FEMA to elevate houses and acquire properties when the opportunity is available.

The Upper Mattaponi Tribe identified that there is limited availability of funding for tribes. UMT hopes to be able improve financial capabilities to better mitigate against disasters. Also, federally recognized tribes have limited ability to utilize bond obligations.

Education and Outreach capabilities are education and outreach programs, campaigns, and methods already in place to implement mitigation activities and communicate hazard –related information. Table 91 below indicates whether Middle Peninsula localities and Tribes have specific education and outreach efforts.

Table 91: This table indicates whether Middle Peninsula localities have specific education and outreach efforts.											
Plans	**Essex**	**Gloucester**	**King & Queen**	**King William**	**Mathews**	**Middlesex**	**Town of Tappahannock**	**Town of Urbanna**	**Town of West Point**	**Rappahannock Tribe**	**Upper Mattaponi Tribe**
Local citizen groups or non-profit organizations focused on environmental protection, emergency preparedness, access, and functional needs populations, etc.	Yes	Yes	No	No	No	Yes	No	Yes	No	Yes	No
Ongoing public education or information program (e.g., responsible water use, fire safety, household preparedness, environmental education)	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	No
Natural disaster or safety related school programs	Yes	Yes	Yes		Yes	Yes	No	Yes	No	No	No
StormReady certification	No	Yes (2014-recertification)	No	No	No	No	No	No	No	No	No
Firewise Communities certification	No	No	No	No	No	No	No	No	No	No	No
Public-private partnership initiatives addressing disaster-related issues	Yes	Yes	No	No	No	Yes	Yes	No	No	No	No
**Note: Each locality and Tribe had the opportunity to provide responses to available capabilities. Therefore, empty squares represent no response from the locality.*											

Essex County has local employees that provide ongoing public education. The County also works with local schools to educate students about water issues, fire safety, and household hazard preparedness addition the County hosts a Disaster Survivor Day each year to teach citizens how to prepare for disasters. The Town of Tappahannock is focused on-going public education regarding water quality and water conservation.

Gloucester County offers a variety of public outreach opportunities for their citizens. As participants in the FEMA CRS program the County has developed a Program for Public Information (PPI) that includes on-going education about water issues, fire safety, household preparedness, environmental education, and hazards. The Emergency Manger provides this outreach and awareness. The County has developed a public-private partnership within the Gloucester Chamber of Commerce in order to host an annual preparedness symposium. The County's Community Emergency Response Team (CERT) performs outreach and education programs for Spring Storms, Hurricane Preparedness, Flood Program Awareness, and Winter Weather Preparedness. Additionally, the County has incorporated lightning safety in natural disaster and safety related school programs.

Within Mathews County the capability to provide education and outreach is limited, yet the school curriculum includes natural disaster and safety related programs. The Building Official's web page has online information and community presentations regarding building codes and floodplain management.

In Middlesex County public education is offered through the Office of Emergency Services. The Town of Urbanna has limited staff and funds, and therefore looks to Middlesex County for the majority of its public engagement efforts. However, the Town has a local citizens group, Friends of the parks (501-3-C organization) that is very interested in resource protection and preservation. The organization is in its formative stages of development but has considerable potential to assist in public outreach.

King William County does not currently have an active public education program, but there's a program currently under development. As for the Town of West Point, they do not have education opportunities for citizens. Staff in Wet Point would need to be trained on hazard mitigation topic before providing outreach programs.

Over the course of 2022, the Upper Mattaponi Tribe is planning to improve public education and outreach to local citizen groups or non-profit organizationsfocused on environmental protection, emergency preparedness, access, and functional needs populations.

On a regional level, the MPPDC launched the Fight the Flood Program in 2020. As this program works to connect private landowners facing rising flood waters with tools and funding to contract with specialized businesses who can help evaluate, design, and build mitigation solutions. As part of this program the website Fight the Flood Program website offers educational material on flooding, flood insurance, and mitigation options.

Existing Mitigation Activities - Structural Projects

Gloucester County's Hurricane Recovery/Mitigation Projects

Gloucester County offers a variety of public outreach opportunities for their citizens. As participants in the CRS program the County has developed a Program for Public Information (PPI) that includes ongoing education about flooding. The PPI and its outreach efforts are managed by Gloucester's Floodplain Administrator in coordination with the Department of Community Engagement and Public Information (DCEPI). This includes participation in Flood Awareness week each March. The Department of Emergency Management also coordinates with DCEPI for outreach efforts related to fire safety, household preparedness, environmental education, and hazards. The County has developed a public-

private partnership within the Gloucester Chamber of Commerce to host an annual preparedness symposium. The County's Community Emergency Response Team (CERT) performs outreach and education programs for Spring Storms, Hurricane Preparedness, Flood Program Awareness, and Winter Weather Preparedness. Additionally, the County has incorporated lightning safety in natural disaster and safety related school programs.

Gloucester County also has an active and on-going hurricane residential recovery program in the Jenkins Creek and Guinea communities in the southern portion of the county. This is where the York River and Mobjack Bay meet the Chesapeake Bay. The county has successfully applied for and received grant funding from HUD/VDHCD as well as FEMA/VDEM to implement their multi-phased residential mitigation program.

Since 2004, Gloucester County has participated in eleven (11) Hazard Mitigation (HMGP) grants, one (1) Repetitive Flood Claim (RFC) grant, and one (1) Community Development Block Urgent Needs (CDBG) grant. Five HMGP grants are still active. Gloucester County has been very active in the mitigation scene receiving more than 25% of the Virginia's HMA allocations since 2005. All the grants were designed to both assist in the recovery from storm events and to help reduce the damages that could come from future events.

The 2006 CDBG Urgent Needs grant built or rehabilitated, on elevated foundations, 7 homes. The homes were all severe loss homes that were substantially damaged by Isabel. The work under this grant was completed in 2009. Under the FEMA Hazard Mitigation Assistance (HMA) program, the County has acquired 30 parcels and has funding to 2 more parcels under 4 FEMA acquisition grants. Each parcel was cleared of its structures and turned into permanent open space. The land was incorporated into an Open Space Plan. Most of the lots are now acting as natural buffers for the Guinea area. One is to be developed as a walking trail. The County continues to look at additional recreation options for the spaces as well. In all the County owns 82 acres acquired under the FEMA HMA grant.

The FEMA HMA grants have 85 funded elevations since 2004 with 60 on new foundations. Gloucester had 7 FEMA elevation grants and 1 FEMA RFC grant. Gloucester also had 4 owners have withdrawn and we are working on completing 21 elevations. All the current grant work should be complete by next summer (2017). The elevation work places the home on a new foundation that is at least two feet above the FEMA required base flood elevation level (Figures 75-80). Although most of the homes in the grants have been in Guinea area residents in Ware Neck, Harcum (Painkatank River), Glass, and Robins Neck have also participated in the program.

The work by the County has helped reduce its total number of repetitive and severe repetitive loss lists. Of the properties in the FEMA HMA grants, 3 acquired properties were identified as repetitive loss however none of them are severe repetitive loss properties. Sixteen on the elevated homes were repetitive loss properties, 4 of which are severe. All 7 CDBG homes were considered severe repetitive loss homes. In total we have mitigated nineteen repetitive loss properties and 11 severe repetitive loss homes. County's Building Office tracks and has completed all the AW-501 worksheets in order to report to FEMA the completed mitigation activities for these homes.

The total funds allocated by all the grants is just under $12 million dollars. This includes just over $8.5 million plus in federal funds and over $2.5 million in state funds for the FEMA grants and $750,000 in funds for the CDBG program.

Most recently, in July of 2015, Gloucester County received $331,594 of HMGP funding, which is 34% of total state funding. This funding will be used to elevate 2 homes and will allow 2 properties to be

acquired. In both cases this will minimize the risk of future flooding to citizens. Gloucester County has joined into a partnership with the United States Geological Service (USCG) by installing a Tide Gage on the Severn River that is used to monitor flood conditions in the southeastern section of the County.

Figure 75: House in Hayes, Gloucester County - BEFORE elevation.

Figure 76: House in Hayes, Gloucester County- AFTER elevation.

Figure 77: House in Hayes, Gloucester County - BEFORE elevation.

Figure 78: House in Hayes, Gloucester County - AFTER elevation.

Figure 79: House in Hayes, Gloucester County- BEFORE elevation.

Figure 80: House in Hayes, Gloucester County- AFTER elevation.

Mathews County Mitigation Projects
The following are a list of FEMA HMGP grants Mathews County has received for elevation of houses and acquisitions of properties over the past five (5) years.

Project Number SLR-2009-115-002
This was a grant to elevate one house under a Severe Repetitive Loss Program funding the County received from FEMA. The total project budget for this elevation was $207,942.00. This house elevation was advertised for bid, a contract was awarded, and the house was elevated above the Base Flood Elevation (BFE) for the Special Flood Hazard Area (SFHA) where the property is located. The property owner provided a ten (10) percent match of the contractor's bid amount using his funds. Ninety (90) percent of the cost for elevating the house was paid for out of the grant.

This house is on FEMA's Severe Repetitive Loss list.

Project Number SLR- 1987-008
The county applied for funding after the remnants of Tropical Storm Ida damaged properties in Mathews in November 2009. The county was awarded funding in the amount of $889,825 to acquire one property and elevate eight (8) houses. The County awarded contracts to elevate four (4) houses and the work has been completed. One property was acquired and there is one house remaining to be elevated. Three houses were not elevated because the eligible property owners chose not to participate in the grant program.

Three of the four houses that were elevated are on FEMA's Repetitive Loss list. The property that was acquired is on the list, and the one house remaining to be elevated is on the list.

Project Number HGMP-4042-002
The County applied for funding subsequent to the Louisa Earthquake. The County was awarded funding in the amount of $1,923,973 to elevate nine (9) homes and acquire three (3). All twelve (12) homes were located throughout the County, but primarily in the southern and western portions of the County that were most susceptible to flooding.

To date eight (8) homes have been elevated. One house was acquired. Three (3) property owners were removed from the grant program or decided not to participate.

Project Number HMGP – 4045 – 002
The County applied for funding subsequent to the Tropical Storm Lee event. The County was awarded funding in the amount of $1,122,865 to elevate nine (9) homes. All nine (9) homes are located throughout the County, but primarily in the eastern and southern portions of the County that are most susceptible to flooding. To date, three homes have been elevated. Five property owners are not participating in the grant program. Two houses that were elevated are on the Repetitive Loss List.

Project Number HMGP – 4092-002
The County applied for funding subsequent to the Hurricane Sandy event. The County was awarded funding in the amount of $1,774,360 to elevate eleven (11) homes and acquire one property. All twelve (12) homes were located throughout the County, but primarily in the eastern and southern portions of the County that were most susceptible to flooding. To date, three (3) homes have been elevated (Figures 81 and 82). Two homes have been awarded a

contract to be elevated and four homes are ready to be advertised for bid. One house is ready to be acquired. Two property owners are not participating in the grant program.

One house that was elevated is one the Repetitive Loss list and one house that is ready to be advertised for bid is on the list.

Figure 81: Photos of an elevated home in Moon, Va during (left) and after (right) (Mathews County, 2015).

Figure 82: Photos of an elevated home in Port Haywood during (left) and after (right) being elevated (Mathews County, 2015).

Town of West Point Hurricane Recovery/Mitigation Projects

In March of 2010 the Town of West Point applied for funding through the Virginia Department of Emergency Management Hazard Mitigation Grant Program. The Town proposed a project to elevate a home on Kirby Street to base flood elevation plus 1 foot to relocate the home outside the 100-year flood plain. This would reduce flood risk from major storms (i.e. Hurricane Isabel) as well as minor nor'easters.

Upon receiving notice of funding in 2013, the Town requested bids to complete the elevation project. In 2015 the project was finally complete. Below are pictures of the house before and after elevation (Figure 83 and 84).

Figure 83: Photos of a home in the Town of West Point before being elevated.

Figure 84: Photos of a home in the Town of West Point after being elevated.

In conjunction with this elevated home, the Town of West Point received funding through the HMA to relocate the Public Works Building on 7th Street to King William Avenue due to repetitive flooding. This move created a more stable working environmental for employees.

Both the Kirby Street property and the Publics Works Building were on the repetitive loss list prior to mitigation action.

The Town of West Point also received funding through FEMA and VDEM to acquire multiple properties – including two properties on 1st Street, one property on 2nd Street, one property on Glass Island Road as well as one property on 5th street. The 5th Street properly was on the repetitive loss list.

Observations from Existing Structural Mitigation Projects
Due to the engineering and other technical aspects of structural mitigation projects as well as the limited number of county personnel available to undertake these new initiatives, Gloucester County has hired a consulting firm, Community Planning Partners, to assist them with their grant funding applications, project engineering/design as well as construction management of their multi-phased mitigation projects. Mathews County has hired the same consulting firm as Gloucester and have a total of 47 properties either they have mitigation using HMA funds or are in the process of mitigating.

To date no other Middle Peninsula locality has undertaken structural mitigation projects. However, 5 private property owners in the town of Urbanna, with their own financial resources, have rebuilt their homes that were damaged by flooding from Hurricane Isabel. These structures were rebuilt in accordance with the locality's floodplain regulations, and they were elevated by either being built on stilts or with block crawl spaces having the required vented openings in the foundation.
When Middle Peninsula localities undertake future structural mitigation projects, it can be expected that they will continue to utilize the services of either consulting engineering firms or local agencies that have the technical capacity to undertake housing elevation projects.

The localities have the capacity to offer operational support services such as office space and some administrative support services in their role as the official FEMA grantee. Once again, project management will in all likelihood be a contracted service due to the dependency on grant funding and the technical complexity of elevating houses.

Rappahannock Tribe Mitigation Efforts
Ongoing emergency management/recovery /mitigation project efforts by the Rappahannock Tribe include:

- The delivery emergency medical supplies, food, and medicine to home bound Tribal members
- PPE supplies are now available, and some have been distributed to Tribal members. The remaining supply on site and available to members. Staff members handle the requests for medical supplies, food, and medicine
- A newly hired Director of Emergency Management is reviewing the service area's hazards, key stakeholders, and available resources. The Director is meeting with regional, state, and federal emergency managers and hazard mitigation planners to support the development of the Rappahannock Tribe's Emergency Operation Plan (EOP). A complete interim key contact document was developed to facilitate communication, planning, and response coordination during disaster events. A more complete EOP is currently under development and is anticipated to be completed by October 1, 2021

The Rappahannock Tribe has constructed a new operations building to house the Emergency Management Department. The building is roughly 90% complete, but the Tribe is still waiting for contractors to finalize the build before being able to occupy the new facility. The Tribe has obtained Broadband Internet services and have upgraded phones to be used throughout the emergency management operations building. They have increased their phone call capacity from 2 simultaneous calls to the ability to handle up to 29 simultaneous calls.

The Director of Emergency Management has also identified and communicated to Tribal members the need to develop volunteer teams for emergency response staffing. Currently recruiting class instructors and interested volunteers participate in the following programs:

- •CERT – Community Emergency Response Teams
- •Welfare Check/Member Assistance – General assistance for Tribal Members
- • Emergency Operations Center (EOC) – Coordination of disaster response
- • Emergency Evacuation Center - Provide for the basic needs for 100 displaced persons
- • Training in emergency care and emergency response - First Aid, CERT, EMTs

Finally, a Ford Explorer has been purchased and is in use by the Emergency Management Department. The vehicle is temporarily equipped by the Emergency Management Director's personal emergency response equipment. Plans include obtaining Tribal owned emergency equipment to outfit the vehicle.

Upper Mattaponi Tribe Existing Mitigation Efforts

The Upper Mattaponi Indian Tribe has focused heavily on ensuring tribal citizens are prepared throughout the coronavirus pandemic. COVID-19 care packages have been distributed regularly over the last two years equipped with test kits and personal protective equipment.

The newly hired Emergency Management Coordinator is meeting with key stakeholders, including county, state, and federal emergency managers, and partners. Through these partnerships, the Emergency Management Coordinator is working on developing an official Tribal Emergency Operations Plan. Time-sensitive Emergency Response Plans have been created to respond to emergencies as they occur.

National Flood Insurance Program (NFIP)

The AHMP Steering Committee was given an opportunity to share progress made on implementing the National Flood Insurance Program (NFIP) locally. Information was received through a spread sheet developed by FEMA. The questions inquire about actions taken within the communality with regards to floodplain identification and mapping, floodplain management, and flood insurance.

As all 9 Middle Peninsula jurisdictions participate in the NFIP as administered by FEMA, each jurisdiction has implemented local floodplain ordinances that include requirement that comply with the minimum FEMA – or in some case exceed the minimum requirements prescribed by FEMA. As seen in Section 7 of this plan update, 8 of the 9 Middle Peninsula jurisdictions have implemented Base Floor Elevation (BFE) regulations that require structures to be an additional 1' or over BFE. The 8 Middle Peninsula jurisdictions that require this more restrictive regulation are Essex, Gloucester, King William, King & Queen, and Middlesex Counties and the Towns of Urbanna, West Point, and Tappahannock.

Enforcement of the floodplain regulations are undertaken by the locality's Zoning Administrator and Building Official.

All 9 Middle Peninsula localities remain in full compliance with their floodplain and building code regulations as evidenced by their periodic reviews of their NFIP related activities by FEMA and VDCR evaluators.

For additional details about locality NFIP, please visit Appendix H.

Stormwater Management Ordinances
During the 2012 General Assembly session, the Virginia General Assembly passed legislation (HB 1065) that requires localities throughout the state to develop, adopt, and implement local a Virginia Stormwater Management Program (VSMP) by July 1, 2014. This bill integrated elements of the Erosion and Sediment Control Act, the Stormwater Management Act, and the Chesapeake Bay Preservation Act so that these regulatory programs could be implemented in a consolidated and consistent manner, resulting in greater efficiencies (one-stop shopping) for those being regulated. However, in 2014, additional action by the General Assembly, with the passing of House Bill 1173/Senate Bill 423, localities were provided an "Opt-Out" option that would leave the administration of the VSMP to the Virginia Department of Environmental Quality (DEQ) instead of local administration. As a result, only Gloucester County has chosen to develop and administer a local VSMP. All other localities within the Middle Peninsula as decided to "opt-out" and have DEQ administer the program. While this is the status of the VSMP, the program is still influx as DEQ wants to relinquish administrative power and give it back to the localities.

Please see Appendix L for Gloucester County's Stormwater Management Ordinance.

Future Mitigation Capabilities and Opportunities
Local governing bodies are charged with protecting the health, safety, and welfare of its residents. The 6 Boards of Supervisors and the 3 Town Council are legally empowered to develop ordinances and policies to implement this charge based on sound and comprehensive review and analysis of flood mitigation proposals and strategies.

In general, the localities will continue to facilitate federal and state grant funded flood mitigation projects for private property owners with the understanding that the property owners will pay for all costs – construction and administration – that are not covered by grant funds.

Public infrastructure flood mitigation projects will be undertaken by the local governing bodies when they determine that the benefits outweigh the costs. Typically, these projects will be incorporated into the locality's Capital Improvement Program and considered for funding by the governing body during their annual budget development and approval process.

Section 7 - Review of Strategies from the 2016 Middle Peninsula All Hazards Mitigation Plan

As Middle Peninsula localities transition from the 2016 AHMP strategies into the 2021 AHMP strategies, it is critical to look at the progress made over the last 5 years to provide a clearer direction moving forward. Therefore, to capture the progress made by localities, the Regional Planner reviewed the 2016 Mitigation Strategies with the AHMP LPT and requested status updates on each 2016 mitigation strategy. Tables 91 to 99 record locality responses and strategy statuses. Please note that the shaded red boxes identify the completed strategies.

Table 91: Essex County – 2016 Mitigation Strategy Status

2016 Strategy	2016 Priority	Status	Comment
1.1.1	Moderate	On-going	The County Building Official administers the Floodplain Management Ordinance for current and new structures.
1.1.2	Moderate	On-going	Ch. 18 of the Floodplain Management Ordinance is being used to manage this.
1.1.5	Low	In-progress	Regional Hampton Road Evacuation Plan
1.1.6	Low	In-progress – will be completed 2017	Regional Hampton Road Evacuation Plan
1.1.8	High	On-going	Board of Supervisors reviewed this at their August 2021 meeting
1.1.9	Low	In-progress	Have not started.
1.1.10	Moderate	On-going	Elevation & Construction Standards are in Ch. 18 of county ordinances. The Floodplain Management Ordinance states Free Board as 1ft elevation BFE (Base Flood Elevation) and regulates this.
1.1.11	Moderate	On-going	Ch. 18 of the Floodplain Management Ordinance enforces this as well as the USBC.
1.1.13	Low	In-progress	There are no plans to promote at this time.
1.1.15	Moderate	On-going	Wetlands Board approvals for shoreline erosion control measures. Encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
2.2.1	Low	On-going	Mutual aid contract is renewed once a year
2.2.2	Low	On-going	Mutual aid contract is renewed once a year
3.1.2	Low	Delayed	There are no plans to promote at this time.
3.1.3	Low	In-progress	Power company maintains their own rights-of-way
3.1.5	Moderate	On-going	Being discussed for the future.
3.1.6	Moderate	On-going	Being discussed for the future.
3.1.8	Moderate	On-going	Being discussed for the future.
3.2.1	Moderate	On-going	GIS coordinator incorporates this into county GIS maps
3.2.2	Low	On-going	Refine and update data sets when changes are made. Also, during the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2), but 2020 Census was not included.
4.1.1	Low	On-going	Will be utilized when plan is adopted

Table 92: Town of Tappahannock – 2016 Mitigation Strategy status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.3	Low	Canceled	All pump stations are enclosed in small buildings and the pumps are above ground. The pump stations have power and flood alarms. There are no plans to relocate the stations at this time
1.1.5	Low	In-progress	Regional Hampton Road Evacuation plan
1.1.7	High	Delayed	Delayed because of VDOT
1.1.9	Low	Delayed	Delayed because of Essex County
1.1.10	Moderate	On-going	Elevation & Construction Standards are in Ch. 18 and the Floodplain Management Ordinance states Free Board, 1ft elevation BFE (Base Flood Elevation) and regulates this.
1.1.11	Moderate	On-going	Ch. 18 the Floodplain Management Ordinance enforces this as well as the USBC.
1.1.15	Moderate	In-Progress	Encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
2.2.1	Low	On-going	Mutual aid contract is renewed once a year
2.2.2	Low	On-going	Mutual aid contract is renewed once a year
3.1.2	Low		There are no plans to promote at this time.
3.1.3	Low		Power company maintains their own rights-of-way
3.1.5	Moderate	On-going	Being discussed for the future.
3.1.6	Moderate	Not started	Being discussed for the future.
3.2.2	Low	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	On-going	Adopted a Floodplain overlay district as a component of the County's zoning ordinance

Table 93: Gloucester County – 2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	High	On-going	Gloucester has Hazard Mitigation Management Team consisting of various staff members to oversee FEMA grant projects. The Projects are managed by the Engineering Services Department. The majority of projects are residential elevations.
1.1.2	Low	On-going	Outreach efforts are conducted in general but no targeted efforts towards commercial water dependent buildings. These are a very small portion of the greater total of flood risk properties.
1.1.3	High	On-going	Grant applications have been submitted and declined in recent years for pump station relocation. BRIC, as a new program, may provide a path for funding.
1.1.4	Low	Canceled	At this time, the County does not participate in FEMA acquisitions.
1.1.5	Moderate	Not Started	VDOT's Responsibility
1.1.6	Moderate	Not Started	VDOT's Responsibility; The County regularly encourages VDOT to conduct flood resilient efforts on secondary roadways with significant flooding during nuisance tides.
1.1.7	Moderate	On-going	VDOT's Responsibility;
1.1.8	Moderate	On-going	DCR and FEMA regularly review Gloucester's ordinances in accordance with the CRS program. An upcoming review will occur this summer (2021) as part of an ordinance modification.
1.1.11	High	On-going	Gloucester's Building Inspection department regulates development in the floodplain in coordination with the Floodplain Administrator.
1.1.13	Moderate	On-going	Outreach has not been done due to lack of time/manpower.
1.1.15	Low	In-progress	Promotes public education and awareness through current floodplain management committee and through the Middle Peninsula Fight the Flood Program.
1.1.18	High	Completed	Created a GIS layer of data showing pond locations, size, inspection data, and dry hydrant information.
1.1.19	High	On-going	Mitigation strategies are regularly considered when updating plans/programs.
2.2.1	Moderate	Completed & On-going	In 2018 a formal MOA between Gloucester and other MPNN localities was established that provides for EOC & response support if local emergency exceeds local capacity. Formal mutual aid agreements are in place with some neighbor jurisdictions. Potentially additional agreements could be established. Would need to determine need.
2.2.2	Moderate	Completed & On-going	In 2018 a formal MOA between Gloucester and other MPNN localities was established that provides for EOC & response support if local emergency exceeds local capacity. Formal mutual aid agreements are in place with some neighbor jurisdictions. Potentially additional agreements could be established, but the need would have to be determined.
3.1.2	Moderate	On-going	
3.1.3	Moderate	On-going	Grid hardening projects have been underway over the last year through Gloucester, providing redundancy in power supply, also clearing rights of way in many areas.
3.1.4	Moderate	On-going	Gloucester community engagement and Emergency Management departments have been working with Hampton Roads PDC in efforts to promote the new Get Flood Fluent website. Also know your zone info is regularly

			sent to public. Additionally, encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.5	High	On-going	Gloucester County participates in the State's Flood Awareness Week through various media platforms. Gloucester County also send 'RLA' Letters to property owners within the CRS identified Repetitive Loss Areas (Well over 500 structures). Gloucester is working towards sending letters to all homeowners within the regulatory floodplain and SLOSH model Hurricane Zones to notify individuals of their flood zone and hurricane risks. This includes homes outside of the regulatory floodplain that could be flooded by a Cat 1 hurricane.
3.1.6	Moderate	On-going	Gloucester Volunteer Fire and Rescue also trained response personnel in ice rescue.
3.1.7	Moderate	On-going	New programs have been developed and implemented in partnership among Community Engagement, Public Information, and Flood Plain Manager.
3.1.8	Moderate	On-going	Work with Virginia Department of Forestry on public awareness on fire prevention every October.
3.2.2	Low	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	In-progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 94: King and Queen County -2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.6	Moderate	On-going	Route 17 at Parkers Marina completed and now open. Road was raised.
1.1.8	Moderate	Every 2-years	
1.1.9	Low	Canceled	Lack of manpower and funding at the present time
1.1.10	Low	Completed	Adopted new FIRM maps May of 2016 and new code to include 2' of freeboard. Still require flood elevation certificates.
1.1.13	Moderate	On-going	Will continue to work with local TRSWD to obtain farm pond dams when needed.
1.1.15	Low	Completed May 2016	Adopted new FIRM maps May of 2016 and new code. VE flood zone has a higher construction requirement.
1.1.19	Low	Completed	Zoning & Planning has mitigation strategies for development in floodplains and/or RPA buffers with approved WQIA.
2.2.1	High	On-going	Mutual aid agreements exist between various VFDs, Intergovernmental agreements exist for sharing emergency management resources
2.2.2	High	On-going	Mutual aid agreements exist between various VFDs, Intergovernmental agreements exist for sharing emergency management resources
3.1.2	Moderate	Not Started	Roadways in VDOT system needs ditch cleanouts to prevent roadway flooding
3.1.3	Moderate	In-Progress	REC does a great job of this
3.1.4	Low	Completed 2015-2016	Held open house opportunities for the public when new FIRM maps are proposed for adoption. Notified the public via US Mail and/or public notice in the paper.
3.1.6	Moderate	Not started	
3.1.8	Moderate	On-going	
3.2.1	Moderate	Completed	New FIRM maps adopted May of 2016, provided GIS mapping online for public view/use, which includes flood mapping
3.2.2	Low	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	In-Progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 95: King William – 2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	Low	On-going	Structures would need to be constructed above the base flood elevation and no structures are permitted in the 100 ft. RPA.
1.1.4	Low	On-going	
1.1.5	High	On-going	Board of supervisors and VDOT
1.1.6	Moderate	On-going	Board of supervisors and VDOT
1.1.8	Moderate	In-Progress	Updating the ordinance; to be adopted in September 2021
1.1.9	High	In-Progress	Expected to be completed in 2022.
1.1.10	Low	Completed- Spring 2015	Adopted 1.5' freeboard
1.1.11	High	On-going	Any construction in the flood zone is required to meet all flood requirements of the building code, i.e. flood vents and elevation. A certificate of elevation is also required.
1.1.12	Low	On-going	
1.1.13	High	On-going	
1.1.15	Low	On-going	Building code and prohibit construction in wetlands
1.1.18	High	In-progress	GIS layer developed; Added stormwater BMP layer
1.1.19	High	In-progress	Changes are currently being made to the ordinance and the comprehensive plan.
2.2.1	High	Completed	Verbal mutual aid agreement with adjoining counties, dare
2.2.2	High	Completed	Verbal mutual aid agreement with adjoining counties, dare
3.1.2	High	Not started	
3.1.3	High	w/in 1 years	
3.1.4	High	Not started	Very little development around flood plains
3.1.5	High	Completed	Have information available in the planning dept.
3.1.6	High	In-Progress	Information to be provided on the county web-page. This is expected to be completed in November 2021.
3.1.7	Moderate	In-Progress	Provide a handout along with flood insurance information and ratings. Also, the Middle Peninsula Fight the Flood Program offers educational material to property owners. This is expected to be completed in 2022.
3.1.8	Moderate	In-Progress	On the county website and facebook during fire season, department of forestry
3.2.2	High	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	In-progress	Revised Comprehensive. Plan; proposed to be completed and adopted in January 2022.

Table 96: Town of West Point -2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	Moderate	On-going	The HMA application (made in 2010) to elevate a home in the Town of West Point was not funded by FEMA. Since the Towne has applied for funding over the last several years and since it takes a substantial amount of staff time to complete these applications this outcome is discouraging and applications for similar project may not be pursued in the future.
1.1.2	High	Annually	Building department reviews all plans to make sure they meet building code.
1.1.3	Moderate	Completed	Relocated public works building (ie. Second street Pump Station, Bagby Street and Mattaponi Ave Pump Station, and Thompson Avenue Pump Station at West Point Creek) to higher ground.
1.1.5	Low	Not Started	
1.1.7	Moderate	On-going	Town and HRSD continues to study these areas.
1.1.8	Moderate	Completed	Done by Charles Kline with Virginia Department of Conservation and Recreation in 2015.
1.1.9	Moderate	Completed	Completed with Mary Carson Stiff at Wetlands Watch in 2019.
1.1.11	Moderate	Ongoing	Review of zone and building applications
1.1.15	Low	Not Started	
2.2.1	High	Partially - Completed	In 2009, the Rappahannock Volunteer Firefighters Association signed a mutual agreement, but this only consists of a few volunteer departments within the locality (Appendix M). This is not a mutual aid agreement at the County/Town level.
2.2.2	High	Partially - Completed	In 2009, the Rappahannock Volunteer Firefighters Association signed a mutual agreement, but this only consists of a few volunteer departments within the locality (Appendix M). This is not a mutual aid agreement at the County/Town level.
3.1.2	Moderate	On-going	Directing the public to the Middle Peninsula Fight the Flood Program to improve chronic flooding problems.
3.1.3	Moderate	Not started	
3.1.4	Moderate	Completed	Directing citizens to the Middle Peninsula Fight the Flood Program
3.1.5	Moderate	Completed	Directing citizens to the Middle Peninsula Fight the Flood Program
3.1.6	Moderate	Not started	
3.1.7	Moderate	Not started	
3.2.1	Moderate	On-going	Received new GIS information from FEMA, updated as received from FEMA
3.2.2	Low	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	On-going	Adopted a Floodplain overlay district as a component of the County's zoning ordinance

Table 97: Mathews County- 2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	High	In-progress/ ongoing	Four FEMA HMGP grants were awarded to the County for the elevation of houses for thirty-four repetitive loss properties and acquisition of three properties. The elevations and acquisitions in these four grants are in progress and are expected to be completed in 2017. Another FEMA HMGP grant for one severe repetitive loss property was used to elevate the house in 2014.
1.1.2	Moderate	Not started	Delayed because of lack of funding
1.1.3	Moderate	In progress	Provided additional shoreline stabilization material at the base of the New Point Comfort Lighthouse in Mathews County. Also, the County worked to retrofit the fire station in Mathews County to mitigate the impacts of flooding hazards. The fire station in Bohannon was relocated, the station in Gywnn's Island was retrofitted and currently the County is actively seeking real estate to relocate the Mathews Court House fire station.
1.1.4	Moderate	In-progress/ ongoing	FEMA HMGP funds have been used to acquire one repetitive loss property. Two others are in the process of being acquired
1.1.5	Low	On-going	VDOT's responsibility
1.1.6	Moderate	Not started	Delayed because of lack of VDOT funding
1.1.7	Low	On-going	VDOT's responsibility
1.1.8	Low	On-going	
1.1.9	Low	Not started	Delayed because of lack of staff to apply for inclusion and ongoing participation in the CRS Program.
1.1.10	Low	Delayed	Increased elevation requirements proposed for updated floodplain management ordinance, but not adopted. Potential to be addressed in the future.
1.1.11	High	In-progress/ ongoing	County's Building Official is enforcing adopted Floodplain Management Ordinance. Zoning amendments will be considered by the Planning Commission to address recurrent flooding after the five-year review of the Comprehensive Plan.
1.1.13	Moderate	Not started	No request has been made to the NRCS or Tidewater Soil and Water Conservation District for an inventory of farm pond dams.
1.1.15	Low	In-progress/ ongoing	The County's Wetlands Projects Coordinator and the Wetlands Board are promoting "Living Shorelines" as a shoreline erosion control method to property owners by utilizing information provided by VIMS and VMRC.
2.2.1	High	On-going	Currently participating in mutual aid no formal MOU's
2.2.2	High	On-going	Currently participating in mutual aid no formal MOU's
3.1.2	Moderate	In-progress/ ongoing	The County has contracted a third-party to clean outfall ditches experiencing drainage issue. Maintenance is periodically performed by VDOT on ditches within their right-of-way.
3.1.3	Low	Not started	No request has been made to Dominion Power for information or guidance about removing vegetation near power lines. Dominion does maintain certain vegetation clearances near major powerlines throughout the County without any request needed from the County
3.1.4	High	In-progress/ ongoing	Information is made regularly available through the County Website and various social media platforms
3.1.5	High	In-progress/ ongoing	The Department of Planning & Zoning continues to accept applications for the next possible round of FEMA HMGP funding.
3.1.6	Low	Not started	Delayed due to Lack of Staff and Funding

3.1.7	High	In-progress/ ongoing	Department of Planning & Zoning staff provided this information to residents when the Comprehensive Plan was updated in 2010. On-going information has been provided to the Planning Commission regarding this topic in advance of the five-year review of the Comprehensive Plan.
3.1.8	Moderate	Not started	Delayed because of lack of staff
3.2.2	Low	In-progress	1. During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2..2020 Census was not included in HAZUS.
4.1.1	High	On-going	

Table 98: Middlesex County -2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	Moderate	On-going	Managed by Staff on an on-going basis
1.1.2	Low	Not Started	Delayed because lack of staff; any concerns are forwarded to VDOT
1.1.4	Low	Not Started	
1.1.5	High	On-going	Continue to coordinate with VDOT and utilize plan as required.
1.1.6	Low	On-going	Continue to coordinate with VDOT
1.1.8	Hight	On-going	Active program; ordinance adopted.
1.1.9	Low	Not Started	Delayed because lack of staff
1.1.10	High	Completed	Floodplain Ordinance Adopted
1.1.11	High	On-going	Managed by staff on an on-going basis
1.1.13	Moderate	On-going	Managed by staff when required
1.1.15	High	On-going	Managed by staff and Wetland Board
1.1.18	High	Not Started	Delayed because of lack of staff
1.1.19	Moderate	On-going	Managed by staff as required
2.2.1	High	On-going	Middle Peninsula Emergency Management MOU
2.2.2	High	On-going	Middle Peninsula Emergency Management MOU
3.1.2	Moderate	On-going	This occurs as needed
3.1.3	Moderate	On-going	Managed by Staff on an as needed basis
3.1.4	High	On-going	Managed by staff during public education deliveries
3.1.5	High	On-going	This occurs as requested
3.1.6	Moderate	On-going	Managed by staff during public education deliveries
3.1.7	Moderate	Not Started	Reactionary only
3.1.8	Moderate	On-going	Managed by Staff during public education deliveries
3.2.1	Moderate	Completed	
3.2.2	Low	In-progress	During the 2021 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) and.2010 Census was included in HAZUS. 2020 Census data will be used for the next AHMP update.
4.1.1	High	In-progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 99: Town of Urbanna -2016 Mitigation Strategy Status			
2016 Strategy	**2016 Priority**	**Status**	**Comments**
1.1.1	Low	On-going	Greatly increased freeboard requirements in new floodplain ordinance beyond minimum requirement.
1.1.2	Moderate	On-going	
1.1.9	Low	Not Started	
1.1.11	High	On-going	Enforcement of all floodplain/zoning/building regulations in flood zones is actively pursued on an on-going basis.
1.1.15	Low	On-going	Conducted jointly with Middlesex County
1.1.19	Moderate	On-going/In-progress	
2.2.1	High	Partially - Completed	In 2009, the Rappahannock Volunteer Firefighters Association signed a mutual agreement, but this only consists of a few volunteer departments within the locality (Appendix M). This is not a mutual aid agreement at the County/Town level
2.2.2	High	Partially - Completed	In 2009, the Rappahannock Volunteer Firefighters Association signed a mutual agreement, but this only consists of a few volunteer departments within the locality (Appendix M). This is not a mutual aid agreement at the County/Town level
3.1.2	Moderate	On-going	Educational materials periodically placed on web site to encourage maintenance.
3.1.3	Moderate	In-progress	Dominion Energy is currently replacing electrical lines/transformers to increase power for town and reduce power outages. New poles are also being installed.
3.1.6	Low	In-progress	Work with First Responder agencies to provide educational information.
3.1.7	Low	In-progress	Provide information on webpage and provide hand-outs. Also, direct citizens to the Middle Peninsula Fight the Flood Program.
3.2.2	Low	In-progress	1. During the 2015 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2). 2 .2020 Census data will be in the next HAZUS.
4.1.1	High	In-progress	Adopted a Floodplain overlay district as a component of the County's zoning ordinance

The following is a more descriptive version of the mitigation strategies that have been implemented by Middle Peninsula jurisdictions:

Strategies that have been completed since 2016 by the local governments under **Goal 1: Prevent Future Hazard Related Losses** include the following:

1. Gloucester County created a GIS layer of data showing pond locations, size, inspection data, and dry hydrant information.
2. The Town of West Point relocated public works buildings (i.e. Second Street Pump Station, Bagby Street and Mattaponi Ave Pump Station, and Thompson Avenue Pump Station at West Point Creek) to higher ground. Additionally, Mathews County provided additional shoreline stabilization material at the base of the New Point Comfort Lighthouse and retrofitted the fire stations to mitigate the impacts of flooding hazards.
3. King & Queen County, Middlesex County, and Town of Urbanna adopted new code to include 2 feet of freeboard; King William County adopted 1.5 feet freeboard in Spring of 2015.
4. King & Queen County adopted the new FIRM maps in May of 2016.
5. Town of West Point worked with Virginia Department of Conservation and Recreation to have their floodplain ordinance reviewed.

6. Town of West Point utilized the research completed by Wetlands Watch to investigate the FEMA Community Rating System Program. Based on findings the Town of West Point did not find participation in the CRS Program to be beneficial.
7. Mathews County and Town of West Point applied to receive funding through the FEMA HMGP. The Town of West Point application was not funded; however, 4 applications from Mathews were funded to elevate houses for 34 repetitive loss properties and the acquisition of three properties.
8. The development and launching of the Middle Peninsula Fight the Flood Program has become a regional resource for all Middle Peninsula localities and tribes to address flooding on private property and to provide financial resources to implement flood management solutions (i.e. nature-based solutions and living shorelines).

Strategies that have been completed by the local governments under **Goal 2: Improve Community Emergency Management Capability** include the following:

1. Each year the mutual aid agreements amongst all Middle Peninsula localities are renewed to coordinate the region's fire and emergency medical units to ensure a quick and efficient response to severe weather events.
2. Formalized mutual aid agreements amongst all Middle Peninsula localities to coordinate the region's fire units to ensure a quick and efficient response to wildfires has been continued.
3. Gloucester County formalized a MOA in 2018 with Middle Peninsula and Northern Neck localities that provides for EOC (Emergency Operations Center) and response support if local emergency exceeds local capacity.

A strategy that has been completed under **Goal 3: Increase Public Awareness of Vulnerability to Hazards** includes the following:

1. To improve the hazard assessment within the region, a HAZUS analysis was run with the 4.2 version software and 2010 Census data was used.
2. King & Queen County incorporated the digitized local floodplain maps into their GIS database after adoption by the board of supervisors.
3. Middlesex County informed community property owners about changes to the DFIRM/FIRM that would impact their insurance rates.
4. The development and launching of the Middle Peninsula Fight the Flood Program has become a regional information resource for all matters associated with flooding, insurance and flood management solutions (i.e. nature-based solutions and living shorelines).

Canceled Strategies

To provide a quick snapshot of the canceled strategies, below are a list of the strategies and the localities that have canceled them.

- **Strategy 1.1.3: Protect public buildings and public infrastructure from flood waters resulting from 100-year flood storm events.**

Town of Tappahannock canceled this strategy as the Town does not have current plans to protect public buildings and public infrastructure from flood waters. Currently all pump stations are enclosed in small buildings and the pumps are above foundation levels. The pump stations have power and flood alarms.

- **Strategy 1.1.4: When elevating or flood proofing is not feasible for existing buildings threatened by flooding, land purchase and conversion to non-residential recreation/conservation land uses should be pursued by the locality or Tribe using FEMA Grant Funds.**
  Gloucester County canceled this strategy since the County does not participate in FEMA acquisition program. The management of acquired land may cause additional costs to the County.

- **Strategy 1.1.9: Investigate the FEMA Community Rating System (CRS) Program in the Middle Peninsula localities that are not currently participating in it, which can ensure a less flood hazard prone community and thereby lower flood insurance rates for its residents.**
  King & Queen County canceled this strategy due to lack of manpower and funding. This strategy may be revisited in future AHMP updates.

Completed Strategies

To provide a quick snapshot of the completed strategies, below are a list of the strategies and the localities that have completed them.

- **Strategy 1.1.8: Review locality's compliance with the National Flood Insurance Program with a bi-annual review of their Floodplain Ordinance and any newly permitted activities in the 100-year floodplain.**

  Based on the results of their compliance review with Virginia Department of Conservation and Recreation (DCR), locality officials responsible for managing the locality's floodplain program recommended amendments to the local Floodplain Ordinance and/or departmental policies/procedures as requested by compliance officials in a timely manner after the review.

  Strategy 1.1.8 was completed by the following Middle Peninsula locality:

  1. ***Town of West Point.***

- **Strategy 1.1.9: Investigate the FEMA Community Rating System (CRS) Program in the Middle Peninsula localities that are not currently participating in it, which can ensure a less flood hazard prone community and thereby lower flood insurance rates for its residents.**

  Localities determined the steps and resources needed to become a certified CRS Program Community.

Strategy 1.1.9 was completed by following Middle Peninsula localities:

1. ***Town of West Point.***

- **Strategy 1.1.10: Investigate and implement increasing building elevation requirements for structures proposed in flood zones.**

Middle Peninsula localities are adversely affected by flood water surges from coastal storms to some extent - with decreasing severity as you move from the southeastern-most areas to the northwestern-most portions of the region.

Localities should consider adopting an ordinance to increase freeboard regulatory floodplain.

Strategy 1.1.10 was completed by the following Middle Peninsula localities:

1. ***King & Queen County,***
2. ***King William County, and***
3. ***Middlesex County.***

- **Strategy 1.1.15: Promote coastal construction techniques that will minimize soil erosion and shoreline damage caused by coastal storm surges**

Locality staff will work with engineers from the Virginia Marine Resources Commission (VMRC) and Virginia Institute of Marine Science Shoreline Studies Program to determine what coastal construction techniques can be used by waterfront property owners to lessen coastal erosion/flooding along the water's edge during severe storm events. Also, localities can encourage citizens to participate in the Middle Peninsula's Fight the Flood Program.

Additionally, as FEMA developed new Flood Insurance Rate Maps a new information layer was added called the Limit of Moderate Wave Action (LiMWA) that identifies the 1.5-foot wave height. With this new information communities and property owners can make more informed decision about reducing their coastal flood risk.

Strategy 1.1.15 was completed by the following Middle Peninsula localities:

1. ***King & Queen County.***

- **Strategy 1.1.18: Create a GIS layer of data showing pond locations, their size, inspection data, and dry hydrant information to improve fire response.**

Strategy 1.1.18 was completed by the following Middle Peninsula localities:

1. ***Gloucester County.***

- **Strategy 1.1.19: Integrate mitigation strategies into locality plans, policies, codes and programs across disciplines and departments.**

  The localities worked to integrating mitigation strategies into regional, county, and/or town plans (i.e. Comprehensive Plan, Stormwater Management Plan, Water Supply Plan, etc), policies, codes (i.e. ordinances) and programs to help support hazard risk reduction.

  Strategy 1.1.19 was completed by the following Middle Peninsula localities:

  1. ***King & Queen County.***

- **Strategy 3.1.4: Promote public education programs to ensure that property owners are fully informed about the flood hazards on the property that they own**

  Each local and Tribal government will develop and post flood mitigation materials on the Emergency Services Section of their website. Posted information will include a list of the locality or Tribe's mitigation strategies and technical information that the local property owners can use to help alleviate flood damage to their properties.

  Strategy 3.1.4 was completed by the following Middle Peninsula localities:

  1. ***King & Queen County, and***
  2. ***Town of West Point.***

- **Strategy 3.1.5: Develop a public education campaign for residents living in the 100-year floodplain, especially those living on FEMA's list of SRL and RL properties, listing methods for them to decrease flood damage including the availability of any FEMA grant funds for elevation or relocation projects.**

  Technical information should specify design considerations for how to handle all household utility components in flood prone areas as well as breakaway walls and venting options that allow automatic entry and exit of flood waters.

  Strategy 3.1.5 was completed by the following Middle Peninsula localities:

  1. ***Town of West Point.***

- **Strategy 3.2.1: Incorporate the newly digitized local floodplain maps into each County's GIS database after adoption by the local governing body, to the extent possible.**

  Each county's GIS technician/consultant will incorporate the digitized floodplain map data into their system when a GIS system becomes available to the locality.

County planning/zoning officials will ensure that this floodplain data is readily available to property owners so that they are aware of the 100-year flood boundaries on their land.

Strategy 3.2.1 was completed by the following Middle Peninsula localities:

1. ***King & Queen County, and***
2. ***Middlesex County.***

- **Strategy 3.2.2: When the Natural Hazards Mitigation Plan is updated in the future, complete:**
  1. **HAZUS flood runs for the 1 sq. mi. threshold. In most cases, this will need to be done on priority stream reaches as the program does not run efficiently at this level.**
  2. **Re-run HAZUS for plan update to reflect 2010 census data.**

As part of the 2021 update, 2010 census data was reflected in the HAZUS and HAZUS was run using the latest software (Version 4.2).

Strategy 3.2.2 was completed by the following Middle Peninsula localities:

1. ***Essex County,***
2. ***Gloucester County,***
3. ***King and Queen County,***
4. ***King William County,***
5. ***Mathews County,***
6. ***Middlesex County,***
7. ***Town of Tappahannock,***
8. ***Town of Urbanna,***
9. ***Town of West Point, and***
10. ***Rappahannock Tribe.***

- **Strategy 4.1.1: All Natural Hazards: Adopt an Implementation Plan that includes one or more of the following:**

Adopted Floodplain Overlay District as a component of the County's Zoning Ordinance.

1. ***Essex County,***
2. ***Gloucester County,***
3. ***King William County,***
4. ***Mathews County,***
5. ***Middlesex County,***
6. ***Town of Tappahannock,***
7. ***Town of Urbanna, and***
8. ***Town of West Point.***

While Middle Peninsula Localities have worked to complete 2021 mitigation strategies within their jurisdiction to benefit the public and create a more hazard resilient community, each locality continues to work toward comprehensive hazard mitigation. The review of 2016 mitigation strategies highlights

actions taken by localities, and it offers insight into what objectives, goals, and strategies that still need to be accomplished or worked on.

Section 8 - New Mitigation Goals, Objectives, and Strategies

Taking into account the update of the hazard vulnerability assessment using the Kaiser Permanente methodology and the results of the recently completed HAZUS damage assessments, the LPT proposes new and/or updated mitigation strategies to reduce the region's risk to hazards affecting the Middle Peninsula. Please note that the strategies may not be numerical order since some strategies have been completed. The completed strategies can be found in Section 7 of this Plan.

Goal 1: Prevent future losses resulting from natural hazard events.

Objective 1.1: Provide protection for future development to the greatest extent possible.

Strategy 1.1.1: Reduce or eliminate flood damage to residential/business structures that are highly vulnerable for continual flood damage.

Strategy 1.1.1 will be undertaken by the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Middlesex County,**
3. **Gloucester County,**
4. **Mathews County,**
5. **King William County,**
6. **Town of West Point,**
7. **Town of Urbanna,**
8. **Town of Tappahannock, and**
9. **Upper Mattaponi Tribe.**

If requested by citizen living in FEMA Repetitive Loss or Severe Repetitive Loss structure, the Middle Peninsula localities listed above will apply on behalf of the citizen for FEMA grant funds that lessen/eliminate flood damages. Project costs, including staff time, equipment, materials, construction activities, and administrative costs, are reimbursable by FEMA grant funds, but property owners who are benefitting directly from the flood mitigation project may need to provide matching funds.

Some of the localities listed above may want to undertake mitigation projects in one "neighborhood" at a time for consistency/uniformity in the community as well as for some economies-of-scale savings in some of our more rural low-lying areas. The Upper Mattaponi Tribe will work with homeowners that have identified problems and reconstruction projects will be investigated to determine eligibility for grant funding.

According to FEMA data as of 2020, the following is a summary of the number of Repetitive Loss and Severe Repetitive Loss Properties in each locality (Table 100). If the locality is not listed there are no Repetitive Loss or Severe Repetitive Loss Properties.

Table 100: Repetitive Loss Properties and severe repetitive loss properties in the Middle Peninsula.

Locality	Repetitive Loss Properties	Severe Repetitive Loss Properties
Essex County	33	2
Gloucester County	155	18
King William	9	0
Mathews County	162	15
Middlesex County	37	2

Tappahannock	3	0
Urbanna	2	0
West Point	9	0

Please note that in 2020 the MPPDC launched a community Fight the Flood Program that connects property owners facing rising flood waters with tools and funding to contract with specialized businesses who can help evaluate, design, and build solutions. This program is intended to identify and advance flood mitigation activities in the region.

Properties to be mitigated will receive a higher priority ranking by the locality using the following criteria:

1. Severe Repetitive Loss Properties over Repetitive Loss Properties.
2. Willingness and ability of the property owner to pay for the non-FEMA grant funded portion of match of the project costs.
3. Higher benefit/cost ratio properties over lower benefit/cost ratio properties.
4. Projects that reduce flood risks to other nearby properties over those that don't.

Cost/Benefit Implications of Implementing Strategy 1.1.1

This strategy will have direct:

1. Benefits for private property owners by reducing/eliminating the severity of structural flood damage to their homes and businesses.
2. Benefits for private property owners with possible reductions in their future flood insurance premiums.
3. Benefits for FEMA by reducing the number of properties on the Repetitive Loss and Severe Repetitive Loss Lists and subsequent flood insurance claims.
4. Costs for private property owners who will directly benefit from the mitigation work on their property as well as by the federal government through expenditure of FEMA Hazard Mitigation Funds.

Mitigation Strategy addresses the following hazards: hurricanes, winter weather, flooding, sea level rise, and summer storms.

Strategy 1.1.2: Flood proof, to the greatest extent possible, existing water dependent commercial buildings against flooding, including surge velocities (ie. "wave runup"), to ensure continuity and viability of the seafood industry and other water dependent businesses.

Strategy 1.1.2 will be undertaken by the following Middle Peninsula localities:

1. **Essex County,**
2. **Middlesex County,**
3. **Gloucester County,**
4. **Mathews County,**
5. **Town of Urbanna, and**
6. **Town of West Point.**

Each locality listed above will work with the owners of water dependent commercial properties to communicate the full range of flood proofing techniques available to them to decrease their vulnerability to flood losses. For water dependent commercial properties in the Town of Urbanna, Middlesex County will help accomplish this task.

Each locality will advertise and conduct an annual workshop for contractors and property owners to provide instructions on how they can undertake specific flood proofing techniques on their buildings. Please note that in 2020 the Middle Peninsula Planning District Commission launched a community Fight the Flood Program that connects property owners facing rising flood waters with tools and funding to contract with specialized businesses who can help evaluate, design, and build solutions. Therefore, localities will utilize this program as an educational tool and resource to encourage flood proofing.

Cost/Benefit Implications of Implementing Strategy 1.1.2

This strategy will have direct:

1. Benefits for private business owners by reducing/eliminating the severity of structural flood damage that will allow them to maintain the viability of the coastal seafood industry.
2. Benefits for private property owners with possible reductions in their future flood insurance premiums.
3. Benefits for FEMA by reducing the number of properties on the Repetitive Loss and Severe Repetitive Loss lists eligible for subsequent flood insurance claims.

Mitigation Strategy addresses the following hazards: hurricanes, winter weather, sea level rise, flooding, and summer storms.

Strategy 1.1.3: Protect public buildings and public infrastructure from flood waters resulting from 100-year flood storm events.

Strategy 1.1.3 will be undertaken by the following Middle Peninsula localities and Tribe:

1. **Gloucester County,**
2. **Mathews County,**
3. **Town of West Point,**
4. **Town of Urbanna, and**
5. **Upper Mattaponi Tribe.**

The Middle Peninsula localities, as well as other political subdivisions of the state providing public infrastructure in our region, including the Hampton Roads Sanitation District (HRSD), shall incorporate flood protection measures into their critical public buildings and public infrastructure if deemed feasible by local officials. The Upper Mattaponi Tribe will work to determine project eligibility for grant funding.

These flood protection measures should be incorporated into their local Capital Improvements Program (CIP) for funding consideration by the governing body during their annual budget development and approval process, if possible.

A list of the critical public buildings and public infrastructure within localities include the following:

- Flood proof and/or elevate the following public sewerage pump stations:

Locality	Pump Station Name
Gloucester County	Pump Station #11 and Pump Station #13, #15 and #17
Town of Urbanna	Town Marina
Town of West Point	Second Street Pump Station
Town of West Point	Bagby Street and Mattaponi Ave Pump Station
Town of West Point	Thompson Avenue Pump Station at West Point Creek

- Consider mitigation retrofit projects at fire stations in Mathews County at-
    - New Point
    - Mathews Court House

Cost/Benefit Implications of Implementing Strategy 1.1.3
This strategy will have direct:

1. Benefits for local governments and the HRSD by reducing/eliminating flood damage to public sewage systems.
2. Benefits to the public by maintaining public health standards by reducing/eliminating sewage system overflows into public water bodies during severe weather events.
3. Costs to local governments/HRSD to design and construct waterproofing and stabilization improvements to local buildings/infrastructure.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, and summer storms.

Strategy 1.1.4: When elevating or flood proofing is not feasible for existing buildings threatened by flooding, land purchase and conversion to non-residential recreation/conservation land uses should be pursued by the locality or Tribes using FEMA Grant Funds.

Strategy 1.1.4 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Essex County,**
2. **King William County,**
3. **Mathews County,**
4. **Middlesex County,**
5. **Rappahannock Tribe, and**
6. **Upper Mattaponi Tribe.**

Cost/Benefit Implications of Implementing Strategy 1.1.4
This strategy will have direct:

1. Benefits for residential neighborhoods by reducing/eliminating storm construction debris that results from structures that are habitually damaged or destroyed by flood waters.
2. Benefits to the locality, Tribe, and general public by increasing vegetative buffering materials in storm surge zones when land is converted from residential use to conservation/preservation use.
3. Benefits for FEMA by reducing the number of properties on the Repetitive Loss and Severe Repetitive Loss lists and subsequent flood insurance claims.
4. Costs for localities and Tribes, including the maintenance of the property or properties acquired through this grant program.
5. Costs for FEMA through expenditure of Hazard Mitigation Funds for land use conversion program.

Mitigation Strategy addresses the following hazards: hurricanes, flooding, and summer storms.

Strategy 1.1.5: Improve/maintain main evacuation routes (Table 101) used by Middle Peninsula residents and Tidewater residents evacuating severe coastal weather events and add evacuation route insignia to public streets that are part of the hurricane evacuation route.

Strategy 1.1.5 will be undertaken in the following Middle Peninsula localities using available grant funds:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **King & Queen County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock, and**
8. **Town of West Point.**

Table 101: Main Evacuation Routes	
Locality	**Road Name/Location**
Essex/Tappahannock	Route 17 at June Parker Marina
King William County	King William Drive (Route 30) at Cypress Swamp at Olson's Pond
Gloucester County	Route 17 N
Mathews County	Route 14 to Rt 198 N to 17 N
Town of West Point	When Bridges are Closed due to Winds above 45 miles per hour: Route 30, however Rt 30 can close due to flooding at Cypress Swamp. When bridges are open: Rt 33 Wet to Route 64

Cost/Benefit Implications of Implementing Strategy 1.1.5

This strategy will have direct:

1. Benefits for both public motorists and the VDOT Primary Road System by decreasing flooding and flood damage to the Middle Peninsula's primary hurricane evacuation routes.
2. Benefits to local resident and seasonal visitors to better visualize routes who may not be aware that the route exists.
3. Substantial costs in federal and state transportation construction funds to elevate Route 17 and Route 30.
4. Costs of producing and erecting the signs.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, and flooding.

Strategy 1.1.6: Improve/maintain/reconstruct public roads that hinder the evacuation of Middle Peninsula and Tidewater residents fleeing flood waters from coastal storms.

Strategy 1.1.6 will be undertaken in the following Middle Peninsula localities using available grant funds (i.e. VDOT and VDEM):

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Middlesex County, and**

6. Mathews County.

Table 102: VDOT Maintained Collector Roads in King and Queen County.		
Route	**Road Name**	**Location of Flooding**
749	Kays Lane	at Root Swamp
721	Newtown Road	Near Bradley Farm Road
721	Newtown Road	Near Level Green Road
721	Newtown Road	Near Cedar Plane Road
721	Newtown Road	Near Glebe Road
623	Indian Neck Road	Near Rappahannock Culture Center
625	Poplar Hill Road	Nar Spring Cottage Road
628	Spring Cottage Road	Near Eastern View Road
628	Todds Bridge Road	Near Gunsmoke Lane
628	Pattie Swamp Road	At swamp
631	Fleets Mill Road	At Fleets Millpond
636	Minter Lane	At Walkerton Creek
631	Norwood Road	At Dickeys Swamp
620	Powcan Road	At Poor House Lane
634	Mt. Elba Road	At Flat Areas
620	Duck Pond Road	At Garnetts Creek
633	Mantua Road	At Garnetts Creek
617	Exol Road	At Exol Swamp
14	The Trail	At Truhart
614	Devils Three Jump Road	At Mt. Olive Road
613	Dabney Road	At Little Tastine Swamp
611	Tastine Road	At little tastine swamp
603	Lombardy Road	At Little Tastine Swamp
608	Clancie Road	At Bugan Villa Drive
601	Stratton Major Road	Near Union Prospect Baptist Church
601	Stratton Major Road	Near Union Road
644	Jonestown Road	At Meadow Swamp
605	Plain View Lane	At Guthrie Creek
601	Cherry Row Lane	At Guthrie Creek and swamp
666	Tuckers Road	entire Road including Tuckers R.P.
667	Wrights Dock Road	Entire road
640	Lyneville Road	At 36" cross-pipes
625	Bryds Mill	At cross-pipes
615	Union Hope Road	At Exol Swamp
604	Bryds Bridge Road	At Bryds Bridge
612	Lilly Pond Road	At Dragons Swamp Bridge
610	Dragonville Road	At Timber Brook Swamp
614	Rock Springs Road	At bridge
14	Buena Vista Road	At King & Queen/Gloucester County Line

Table 103: VDOT Maintained Collector Roads in Essex County		
Route	**Road Name**	**Location**
617	Island Farm Road	Piscataway Creek
646	Fort Lowery Lane	Rappahannock River
680	River Place	Rappahannock River

Table 104: VDOT Maintained Collector Roads in King William County/West Point		
Route	**Road Name**	**Location**
636	VFW Road	Cypress Swamp
632	Mt. Olive-Cohoke Road	Intersection of Route 633
609	Smokey Road	Herring Creek
628	Dorrel Road	Herring Creek
1006	Thompson Avenue	West Point Creek
1003	Chelsea Road	West Point Creek to dead end
1130	Glass Island Road	Mattaponi River
1107	Kirby Street	1st to 7th Street
n/a	1st to 7th Street	Between Kirby Street and Pamunkey River
n/a	2nd to 5th Street	Between Lee Street and Mattaponi River

Table 105: VDOT Maintained Collector Roads in Gloucester County		
Route	**Road Name**	**Location of Floodwaters**
684	Starvation Road	From Big Oak Lane to ESM
662	Allmondsville Road	From Rt. 606 to Rt.618
618	Chappahosic Road	From Rt. 662 to Rt. 639
636	Brays Point Road	From Eagle Lane to ESM
1303	Carmines Island Road	From Gardner Lane to ESM
646	Jenkins Neck Road	Various spots from Owens Road to ESM
648	Maundys Creek Road	From Rt. 649 to ESM
649	Maryus Road	From Haywood Seafood Lane to ESM
652	Rowes Point Road	From 653 to ESM
649	Severn Wharf Road	Various spots from 653 to ESM
602	Burkes Pond Road	From Friendship Road to Burkes Mill Drive
623	Ware Neck Road	From Rt. 14 to Ware Point Road
3	John Clayton Memorial Highway	From Cow Creek to Crab Thicket Road
17	George Washington Memorial Hwy	From Woods Cross Road to Adner Road, and at the Gloucester / Middlesex line at Dragon Run
614	Corduroy Road	Robins Neck to dead end

Table 106: VDOT Maintained Collector Roads in Mathews County		
Route	**Road Name**	**Location**
610	Marsh Hawk Road	From Rt. 614 to Rt. 611
600	Circle Drive	From Rt. 14 to Rt. 14
600	Light House Road	From Rt. 14 to ESM
611	Tabernacle Road	From Rt. 613 to Rt. 610
611	Tabernacle Road	From Rt. 610 to 609
609	Bethel Beach Road	From Rt. 610 to ESM
609	Bethel Beach Road	From Rt.614 to Rt. 611
643	Haven Beach Road	From Rt. 704 to ESM
633	Old Ferry Road	From Rt. 663 to Gwynn's Island Bridge
608	Potato Neck Road	From Rt. 649 to ESM
644	Bandy Ridge Road	From Rt. 611 to Rt. 614

Table 107: VDOT Maintained Collector Roads in Middlesex County		
Route	**Road Name**	**Location**
648	Montague Island Road	From Rt. 604 to ESM
651	Smokey Point	From Rt. 640 to Rt. 685
1103	Irma's Lane	From Rt. 33 to Rt. 1102
628	Mill Creek Road	From Rt. 702 to ESM

636	Timber Neck Road	From 643 to Rt. 659
604	Bayport Road	At Masons Mill Swamp
648	Montague Island Road	At Mud Creek
604	Nesting Road	At Mud Creek
610	Burchs Mill Road	At Burch Pond
606	Briery Swamp Road	At Briery Swamp
602	Wares Bridge Road	At Wares Bridge
602	Wares Bridge Road	At Briery Swamp
603	Farley Park Road	At New Dragon Bridge
618	Lovers Retreat Lane	At Dragon Run Swamp
602	Old Virginia Street	At LaGrange Creek/Hilliards Mill Pond
17	Tidewater Trail	Nickleberry Swamp
17	Tidewater Trail	At Dragon Swamp
616	Town Bridge Road	At Glebe Swamp
616	Town Bridge Road	At Town Bridge Swamp
629	Stormont Road	At My Lady Swamp
620	Philpot Road	At Healy's Mill Pond Swamp
625	Bob's Hole Road	At Mill Creek
624	Regent Road	At Mill Creek
622	Dirt Bridge Road	At Locklies Creek
625	Barracks Mill Road	At Barracks Mill Pond
33	General Puller Highway	At Conrad Pond/Wilton Creek
631	North End Road	At Sturgeon Creek
688/ 622/ 654/ 1113/33	All Stingray Point Roads	

Cost/Benefit Implications of Implementing Strategy 1.1.6

This strategy will have direct:

1. Benefits to residents who will be better able to safely leave their neighborhoods during evacuations when requested by emergency response officials.
2. Benefits to the longevity of the VDOT Secondary Road System as the state struggles to maintain their existing public road network from future flood damages.
3. Substantial costs in federal and state transportation construction funds to make roadway and drainage structure improvements to the many low-lying roads in the Middle Peninsula Region.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, and summer storms.

Strategy 1.1.7: Improve public roads that adversely affect critical public infrastructure in the floodplain.

Strategy 1.1.7 will be undertaken in the following Middle Peninsula localities:

1. **Gloucester County,**
2. **Mathews County,**
3. **Town of Tappahannock,**
4. **Town of Urbanna, and**
5. **Town of West Point.**

Locality	Road Name/ Location
Tappahannock	Newbill Drive
Town of West Point	Second Street
Town of West Point	Bagby Street and Mattaponi Ave
Town of West Point	Thompson Avenue at West Point Creek

Significant storm water runoff from the downtown Tappahannock Business District combined with storm surge activity from the adjacent Rappahannock River causes inundation and the undermining of Newbill Drive. The Town of West Point is focused on improving public roads where sewer pump stations are located in order to reduce flooding inundation that could impact how the pump functions. Within Gloucester County two segments of Route 17 – George Washington Memorial Highway are located in a special flood hazard aera and are potentially affected by storm surge. The first is near the Court House area of the County and would be potentially inundated by a storm surge from a Category 1 hurricane. The second area is located at the southern end of the County and has potential to be inundated by a storm surge from a Category 3 or 4 hurricane. Improving these road segments could protect the public infrastructure located in the Court House Area, including government buildings as well as pump stations (#11 and #13). In addition to these two segments, all roads in Gloucester County used to access critical infrastructure are important and may be improved when needed.

Cost/Benefit Implications of Implementing Strategy 1.1.7
This strategy will have direct:

1. Benefits to the residents of the Town of West Point that utilize the sewer pump stations. The pump station will remain fully functional during and after severe flooding events.
2. Capital costs to improve storm water drainage in order to avoid future damage to roadway and pump stations.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, winter storms, dam failure, and summer storms.

Strategy 1.1.8: Review locality/Tribe's compliance with the National Flood Insurance Program with a bi-annual review of their Floodplain Ordinance and any newly permitted activities in the 100-year floodplain.

Strategy 1.1.8 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **King & Queen County,**
5. **Middlesex County,**
6. **Town of Tappahannock, and**
7. **Upper Mattaponi Tribe.**

Based on the results of their compliance review with Virginia Department of Conservation and Recreation (DCR), locality officials responsible for managing the locality's floodplain program will recommend amendments to the local Floodplain Ordinance and/or departmental policies/procedures as requested by compliance officials in a timely manner after the review. Additionally, as Gloucester

County is a part of FEMA's Community Rating System (CRS), the program conducts a 5-year cycle visit (audit) that includes a review of the ordinances.

Cost/Benefit Implications of Implementing Strategy 1.1.8
This strategy will have direct:

1. Benefits to localities by regularly and systematically tracking development activity in the flood zones to enable timely and effective changes to the locality's Floodplain Ordinance and other associated local land development ordinances and regulations.
2. Minimal costs to locality since the review is done by staff at DCR and recommended changes are completed by the local government body after consultation with local government zoning and floodplain management employees.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, and summer storms.

Strategy 1.1.9: Investigate the FEMA Community Rating System (CRS) Program in the Middle Peninsula localities that are not currently participating in it, which can ensure a less flood hazard prone community and thereby lower flood insurance rates for its residents.

Strategy 1.1.9 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **King William County,**
3. **Mathews County,**
4. **Middlesex County,**
5. **Town of Tappahannock,**
6. **Town of Urbanna,**
7. **Town of West Point, and**
8. **Upper Mattaponi Tribe.**

With the exception of Gloucester County, which is already involved in the CRS Program, locality staff from the localities listed above and the Upper Mattaponi Tribe will determine the steps and resources needed to become a certified CRS Program Community.

Locality staff will take their findings to the County Administrator/Town Manager with a recommendation to either enter into the CRS Program, or not, based on the costs and benefits to its residents. The Upper Mattaponi Staff will take their findings to their Tribal Council.

Cost/Benefit Implications of Implementing Strategy 1.1.9
This strategy will have direct:

1. Benefits to residents living in flood prone areas if the locality/Tribe adopts a CRS Program with lower property insurance rates.
2. Costs of dedicating additional staff time to develop, implement, and manage the CRS Program.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, dam failure, and summer storms.

Strategy 1.1.10: Investigate and implement increasing building elevation requirements for structures proposed in flood zones.

Strategy 1.1.10 will be undertaken in the following Middle Peninsula localities:

1. **Gloucester County,**
2. **Essex County,**
3. **Mathews County,**
4. **Town of Tappahannock, and**
5. **Town of West Point.**

Middle Peninsula localities are adversely affected by flood water surges from coastal storms to some extent - with decreasing severity as you move from the southeastern-most areas to the northwestern-most portions of the region.

The Building/Zoning Officials in each of the localities should conduct a feasibility study focused on increasing the elevation requirements for proposed structures to be built in flood zones would lessen flood damage and lower flood insurance premiums for residents. The lower insurance premiums were analyzed in a 2006 FEMA-commissioned study entitled *Evaluation of the National Flood Insurance Program's Building Standards* (www.fema.gov/library/viewRecord.do?id=2592). The feasibility study should be undertaken using local data sources including the latest FIRM data, FEMA Severe Repetitive Loss and Repetitive Loss Lists and known flood water depths from building permit files in the Building Department's records. Based on favorable findings localities should consider implementing increased freeboard.

In September 2010, Gloucester County updated their ordinances to require new structures to be constructed 2 feet above the Base Flood Elevation. Now in 2021, the locality is currently developing an ordinance revision that proposes 3 feet of freeboard in the regulatory floodplain.

Cost/Benefit Implications of Implementing Strategy 1.1.10

This strategy will have direct:

1. Benefits of reduced flood insurance premiums for Middle Peninsula residents if the locality adopts more stringent regulations.
2. Benefit of lowering future flood insurance claims during severe flooding events if the locality implements greater freeboard requirements.
3. Costs of dedicating locality staff time in the Building/Zoning Departments to develop, implement, and manage the building elevation program.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, dam failure, and summer storms.

Strategy 1.1.11 Continue to ensure that floodplain/zoning/building regulations in flood prone areas are strictly enforced to prevent non-compliant development and the need to invest in additional public infrastructure in these areas in the future.

Strategy 1.1.11 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **King & Queen County**
5. **Mathews County**

6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna,**
9. **Town of West Point, and**
10. **Upper Mattaponi Tribe.**

Utilize location information gleaned from the FEMA-generated Severe Repetitive Loss List and the Repetitive Loss List as an additional source of data when locality officials guide local property owners about proposed construction/development projects in flood-prone areas. The Upper Mattaponi will review plans for new builds to ensure they are compliant with relevant regulations.

Cost/Benefit Implications of Implementing Strategy 1.1.11
This strategy will have direct:

1. Benefits to local officials with being able to provide historical flood occurrence data to prospective homeowners/builders in flood prone areas.
2. Costs of dedicating locality staff time in the Planning/GIS Department to map these properties into the locality's data base.

Mitigation Strategy addresses the following hazards: hurricanes, sea level rise, flooding, dam failure, and summer storms.

Strategy 1.1.12: Limit future development in inundation areas located below large water impoundments.

Strategy 1.1.12 will be undertaken in the following Middle Peninsula locality and Tribe:

1. **King William County and**
2. **Upper Mattaponi Tribe**

The impoundment with the greatest likelihood for adverse flooding impacts downstream from the dam includes the following:

Locality	Facility
King William County	Lake Anne- Located in Louisa County

King William County officials should request Dominion/Virginia Power to assist them with mapping those land areas in the county that are adversely impacted by flood waters from their periodic release of water from Lake Anna. Those maps could then be used by county officials for incorporation into future Comprehensive Plan updates as well as for creating perhaps a possible zoning ordinance overlay district showing periodic inundation areas where future development should be avoided.

The Upper Mattaponi Tribe will monitor plans for development in applicable areas.

Cost/Benefit Implications of Implementing Strategy 1.1.12
This strategy will have direct:

1. Benefits to local officials with being able to guide future land use planning and development in these periodically affected properties.
2. Costs of dedicating locality staff time in the Planning/GIS Department to map these properties into the locality's data base.

Mitigation Strategy addresses the following hazards: coastal/shoreline erosion, sea level rise flooding, and dam failure.

Strategy 1.1.13 Strongly encourage the USDA - Natural Resources Conservation Services staff, Virginia Department of Conservation and Recreation's Regional Dam Safety Engineer, and the Virginia Soil and Water Conservation District Office staff to ensure that farm pond dams remain structurally sound.

Strategy 1.1.13 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County, and**
7. **Upper Mattaponi Tribe.**

There is no organized database of farm pond dams in the Middle Peninsula. Since catastrophic failure of farm pond dams could have a hazardous flooding outcome for those living below them, it is critical that a database be developed by each locality to ensure emergency response actions and mitigation activities are undertaken.

The agencies listed above have a working knowledge within Middle Peninsula communities of where some of the larger dam structures may be located since they have a history of working with farmers on various farmland enhancement and subsidy projects.

For the USDA and the Virginia Soil and Water Conservation Districts King and Queen, King William and Essex Counties are served by an office in Tappahannock while Middlesex, Gloucester and Mathews Counties are served by these agencies located in Gloucester County. As for Virginia Department of Conservation and Recreation's there is one Regional Dam Safety Engineer that serves all Middle Peninsula.

A written request from the County Administrator/Emergency Services Coordinator in each of the six Middle Peninsula counties should be made to these two agencies requesting an inventory of all dams that they are aware of as well as any structural design/physical condition information that they may have about the dam.

This information will be used by County Planning Officials when they evaluate land development requests during the early planning stages of a proposed project.

Cost/Benefit Implications of Implementing Strategy 1.1.13

This strategy will have direct:

1. Benefits to local officials with being able to locate and provide a vulnerability assessment of these structures for future emergency planning strategies.
2. Costs to the USDA and VSWCD agencies with the dedication of staff time and resources to gather and synthesize this data for local government use.

Mitigation Strategy addresses the following hazards: dam failure.

Strategy 1.1.15: Promote coastal construction techniques that will minimize soil erosion and shoreline damage caused by coastal storm surges.

Strategy 1.1.15 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **Mathews County,**
5. **Middlesex County,**
6. **Town of Tappahannock,**
7. **Town of Urbanna,**
8. **Town of West Point, and**
9. **Upper Mattaponi Tribe.**

Locality staff will work with engineers from the Virginia Marine Resources Commission (VMRC) and Virginia Institute of Marine Science Shoreline Studies Program to determine what coastal construction techniques can be used by waterfront property owners to lessen coastal erosion/flooding along the water's edge during severe storm events. Also, localities can encourage citizens to participate in the Middle Peninsula's Fight the Flood Program. This program connects property owners facing rising flood waters with tools and funding to contract with specialized businesses who can help evaluate, design, and build solutions. Additionally, this program focuses on the implementation of nature-based shoreline management solution (i.e. living shorelines, sills, sand nourishment, etc.). As part of the Fight the Flood Program the MPPDC offers a Living Shoreline Incentives program that provides grant and loan funds for the installation of living shorelines. Ultimately these programs provide on-going support to minimize soil erosion and shoreline damage.

Additionally, as FEMA developed new Flood Insurance Rate Maps a new information layer was added called the Limit of Moderate Wave Action (LiMWA) that identifies the 1.5-foot wave height. With this new information communities and property owners can make more informed decision about reducing their coastal flood risk.

Cost/Benefit Implications of Implementing Strategy 1.1.15

This strategy will have direct:

1. Benefits to residents with waterfront property by providing design options that will lessen adverse impacts from flood waters resulting from storm surges.
2. Costs of dedicating locality staff time to work with VMRC, VIMS and MPPDC staff to develop best management design solutions that will mitigate soil erosion and other environmental damages.

Mitigation Strategy addresses the following hazards: coastal/shoreline erosion, sea level rise and flooding

Strategy 1.1.18: Create a GIS layer of data showing pond locations, their size, inspection data, and dry hydrant information to improve fire response.

Strategy 1.1.18 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **King & Queen County,**
2. **Middlesex County,**
3. **King William County, and**
4. **Upper Mattaponi Tribe.**

Cost/Benefit Implications of Implementing Strategy 1.1.18
This strategy will have direct:

1. Benefits to local fire departments by having a data base of water bodies and dry fire hydrant information when responding to fires.
2. Costs of GIS/Community Development staff time with data gathering, data input and data maintenance of the County's GIS system.

Mitigation Strategy addresses the following hazards: wildfires, droughts, lightning, and HAZMAT

Strategy 1.1.19: Integrate mitigation strategies into locality plans, policies, codes and programs across disciplines and departments.

Strategy 1.1.19 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **Mathews County,**
5. **Middlesex County,**
6. **Town of Tappahannock,**
7. **Town of Urbanna,**
8. **Town of West Point, and**
9. **Upper Mattaponi Tribe.**

The localities listed above will work to continue integrating mitigation strategies into regional, county, and/or town plans (i.e. Comprehensive Plan, Stormwater Management Plan, Water Supply Plan, etc), policies, codes (i.e. ordinances) and programs to help support hazard risk reduction. According to FEMA there are two primary ways to effectively accomplish Plan Integration:

1. Integrate natural hazard information and mitigation policies and principles into local planning mechanism and vice versa.
    - Include information on natural hazards (past events, potential impacts, and vulnerabilities).
    - Identify hazard-prone areas throughout the community.
    - Develop appropriate goals, objectives, policies, and projects.

2. Encourage collaborative planning and implementation and inter-agency coordination:
    - Involve key community officials who have the authority to execute policies and programs to reduce risk.
    - Collaborate across departments and agencies with key staff to help share knowledge and build relationships that are important to the successful implementation of mitigation activities.

The Upper Mattaponi Tribe will include mitigation strategies in plans and programs as they are created.

Cost/Benefit Implications of Implementing 1.1.19
This Strategy will have direct:

1. Benefits to localities and the Upper Mattaponi Tribe will include enhanced risk reduction through improved coordination.
2. Benefits to localities will include better defined roles of locality staff (ie. planners, emergency mangers, engineers, etc.) in improving disaster resiliency.
3. Cost is the staff time required to develop and integrate mitigation strategies into locality/tribal plans and policies.

Mitigation Strategy addresses the following hazards: hurricanes, winter weather, tornadoes, coastal/shoreline erosion, sea level rise, flooding, wildfires, high winds/windstorms, dam failure, droughts, lightning, earthquakes, shrink/swell soils, extreme temperatures land subsidence/karsts, air quality, HAZMAT, and summer storms.

Objective 1.2: Provide protection for critical public facilities and essential services.

Objective 1.3: Middle Peninsula localities and Tribes will support implementation of structural and nonstructural mitigation activities to reduce exposure to natural and man-made hazards.

Strategy 1.3.1: Mitigation projects that will result in protection of public or private property from hazards. Eligible projects include, but are not limited to:

- **Acquisition of hazard prone properties,**
- **Mitigation reconstruction,**
- **Elevation of structures in flood prone areas,**
- **Implementation of nature-based solutions (i.e. living shorelines) to protect flood prone properties, reduce coastal erosion, and improve coastal resiliency,**
- **Minor structural flood control projects,**
- **Relocation of structures from hazard prone areas,**
- **Retrofitting of existing buildings and facilities,**
- **Retrofitting of existing buildings and facilities for shelters,**
- **Infrastructure protection measures,**
- **Storm water management improvements,**
- **Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows),**
- **Targeted hazard education, and**
- **Installation of generator connections for shelters.**

Strategy 1.3.1 will be undertaken in the following Middle Peninsula locality and Tribes:

1. **Gloucester County,**
2. **Rappahannock Tribe, and**
3. **Upper Mattaponi Tribe**

As numerous buildings have experienced repetitive damage due to flooding and storm events these structures will be mitigated to reduce or eliminate the potential for damage associated with natural hazards. Gloucester County will also work to reduce vulnerabilities from 2 high hazard dams (ie. Beaverdam Reservoir and Cow Creek Mill Pond). Gloucester County will follow procedures within the Dam Emergency Action Plans to safeguard the lives and reduce damage to the property of citizens in

Gloucester County living and/or working along or near Cow Creek Mill Pond and Beaverdam Reservoir high risk dams.

The Upper Mattaponi Tribe will investigate project eligibility for grant funding. Also, the Upper Mattaponi Tribe will investigate communication systems for advanced and to purchase additional generators for tribal buildings are being developed.

Cost/Benefit Implications of Implementing Strategy 1.3.1
This strategy will have direct:

1. Benefits to the private and public infrastructure by mitigating impacts and vulnerabilities from natural hazards.
2. Benefits to the general public through hazard education programs to prepare for impacts.
3. Benefits for FEMA by reducing the number of properties on the Repetitive Loss and Severe Repetitive Loss Lists and subsequent flood insurance claims.
4. Cost for localities and Tribes include retrofitting existing buildings and facilities, implementing advanced warning systems, maintenance of acquired hazard prone properties, installation of stormwater management practices, as well as deploying hazard education.
5. Costs for FEMA through expenditure of Hazard Mitigation Funds for home elevations and land acquisitions in flood prone areas.

Mitigation Strategy addresses the following hazards: hurricanes, winter storms, tornadoes, coastal/shoreline erosion, sea level rise, flooding, wildfires, high winds/windstorms, dam failure, droughts, lightning, earthquakes, shrink/swell soils, extreme temperatures, land subsidence/karsts, air quality, HAZMAT, and summer storms.

Goal 2: Improve community emergency management capabilities.

Objective 2.1: Improve the ability of the jurisdictional emergency managers to communicate with residents and businesses during and following natural hazard emergencies.

Objective 2.2: Improve communications between the emergency managers working in the Middle Peninsula jurisdictions and other nearby localities.

Strategy 2.2.1: Formalize mutual aid agreements to coordinate the region's fire and emergency medical units to ensure a quick and efficient response to severe weather events.

Strategy 2.2.1 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **Mathews County,**
5. **Town of Tappahannock,**
6. **Town of Urbanna,**
7. **Town of West Point,**
8. **Rappahannock Tribe, and**
9. **Upper Mattaponi Tribe.**

With these little-notice storm events, time is of the essence with the ability to provide life-saving aid to as many residents as possible quickly after the severe storms strike. Currently there is a mutual aid agreement amongst participants of the Rappahannock Volunteer Fire Association, which includes the following Middle Peninsula volunteer fire and rescue departments: Gloucester Volunteer Fire and Rescue, King William Volunteer Fire Department, Lower Middlesex Volunteer Fire, Mathews Volunteer Fire Department, Tappahannock Volunteer Fire Department, Upper Middlesex Volunteer Fire Department, West Point Volunteer Fire and Rescue, Middlesex Volunteer Fire Department, Lower King and Queen Volunteer Fire Department, and Central King and Queen Volunteer Fire Department. While this is inclusive of some fire and rescue departments within the Middle Peninsula, this is not inclusive of all and therefore cannot be labeled as complete.

Cost/Benefit Implications of Implementing Strategy 2.2.1

This strategy will have direct:

1. Benefits for local fire and rescue units since having formalized agreements in place will help to coordinate the dispatching of first response units as needed when there may be limited supply and high demand for assistance.
2. Benefits for residents with coordinated emergency response services during these damaging and potentially life-threatening natural hazards.
3. Costs to implement the mutual aid agreements should be minimal for the jurisdiction with the dedication of a small amount of emergency management and legal staff time.

Mitigation Strategy addresses the following hazards: hurricanes, winter storms, tornadoes, coastal/shoreline erosion, sea level rise, flooding, wildfires, high winds/windstorms, dam failure, droughts, lightning, earthquakes, shrink/swell soils, extreme temperatures, land subsidence/karsts, air quality, HAZMAT, , and summer storms.

Strategy 2.2.2: Formalize mutual aid agreements to coordinate the region's fire units to ensure a quick and efficient response to wildfires.

Strategy 2.2.2 will be undertaken in the following Middle Peninsula localities:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Town of Tappahannock,**
7. **Town of Urbanna, and**
8. **Town of West Point.**

Since numerous wildfire sites can erupt in multiple locations when dry and windy conditions are present throughout the Middle Peninsula, a coordinated regional response by all fire departments serving the area is required to combat this natural hazard. Clearly written and uniform mutual aid agreements can insure a greater degree of a well-coordinated regional response to this natural hazard.

Currently there is a mutual aid agreement amongst participants of the Rappahannock Volunteer Fire Association, which includes the following Middle Peninsula volunteer fire and rescue departments: Gloucester Volunteer Fire and Rescue, King William Volunteer Fire Department, Lower Middlesex Volunteer Fire, Mathews Volunteer Fire Department, Tappahannock Volunteer Fire Department, Upper

Middlesex Volunteer Fire Department, West Point Volunteer Fire and Rescue, Middlesex Volunteer Fire Department, Lower King and Queen Volunteer Fire Department, and Central King and Queen Volunteer Fire Department. While this in inclusive of some fire and rescue department within Middle Peninsula localities, this is not inclusive of all and therefore cannot be labeled as complete. Please note that this strategy focuses on creating mutual aid agreements at the County level.

Cost/Benefit Implications of Implementing Strategy 2.2.2
This strategy will have direct:

1. Benefits for local and nearby fire units since having formalized agreements in place will help to coordinate the dispatching of first response units as needed when there may be a limited supply and a high demand for assistance during times of multiple wildfires.
2. Benefits the residents with coordinated emergency response services during this damaging and potentially life-threatening natural hazard.
3. Costs to implement the mutual aid agreements should be minimal for the jurisdiction's emergency management and legal staff.

Mitigation Strategy addresses the following hazards: wildfires.

Objective 2.3: Improve the ability of localities to communicate with the Virginia Emergency Operations Center during state and federally declared disasters.

Goal 3: Increase the public's awareness and educational level of their vulnerabilities to natural hazards.

Objective 3.1: Provide information to residents and businesses about the types of natural hazards that they may be exposed to, where they are likely to occur and what they can do to better prepare for them or to avoid their adverse effects.

Strategy 3.1.2: Encourage private property owners to perform regular and routine maintenance of ditches and culverts in order to keep them free of debris, with a special emphasis on road sections where there are chronic flooding problems, including those listed earlier in the plan.

Strategy 3.1.2 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna,**
9. **Town of West Point,**
10. **Rappahannock Tribe, and**
11. **Upper Mattaponi Tribe.**

As previous noted, there are many VDOT Secondary Roads that are inundated by flood waters during significant storm events. Oftentimes, the flooding occurs at low-lying section of these roads where the drainage pipes and ditches have been partially or completely blocked by vegetative debris.

Property owners with road frontage should be actively encouraged by local Emergency Management staff, by developing a proactive public information program, to keep ditch lines free of vegetative debris which would lessen the flooding at these stressed road crossings and better allow for vehicles to evacuate during severe storm events.

Cost/Benefit Implications of Implementing Strategy 3.1.2
This strategy will have direct:

1. Benefits for residents living in flood prone areas that will allow them safer evacuation and return routes during severe flooding events.
2. Costs for public information notifications via printed media, reverse 911 systems, County websites or e-mail messages.

Mitigation Strategy addresses the following hazards: flooding, summer storms, hurricanes, and sea level rise.

Strategy 3.1.3: Encourage the two power companies operating in the Middle Peninsula Region to maintain system components, including power line rights-of–way, to minimize interruptions of the electrical power grid for severe weather.

Strategy 3.1.3 will be undertaken in the following Middle Peninsula localities:

1. **Essex County**
2. **Gloucester County**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna, and**
9. **Town of West Point.**

Local Emergency Service Coordinators will work closely with Community Relations/Education employees at Dominion/Virginia Power and Rappahannock Electric Cooperative to inform and guide to their customers about the importance of keeping trees and brush away from electric power lines on their property in order to decrease the possibility of storm damage to the power grid during severe rain/windstorm events.

Educational mailings, such as landscape design techniques as well as a list of plants to grow under power lines to promote attractive landscaping while protecting the power lines from damaging vegetative growth, could be developed by Dominion/Virginia Power and Rappahannock Electric Cooperative staff and mailed as insert with property owners' monthly electric bills.

Cost/Benefit Implications of Implementing Strategy 3.1.3
This strategy will have direct:

1. Benefits local residents with more reliable electric services during severe weather events.

2. Benefits power companies with lower maintenance and repair costs for their rights-of-way and power system equipment.
3. Costs to the 2 power companies to produce and disseminate educational materials to their customers.

Mitigation Strategy addresses the following hazards: hurricanes, winter storms, tornadoes, flooding coastal/shoreline erosion, high winds/windstorms, earthquakes, and summer storms.

Strategy 3.1.4: Promote public education programs to ensure that property owners are fully informed about the flood hazards on the property that they own.

Strategy 3.1.4 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Gloucester County,**
2. **King William County,**
3. **Mathews County,**
4. **Middlesex County,**
5. **Town of Urbanna,**
6. **Rappahannock Tribe, and**
7. **Upper Mattaponi Tribe.**

Each local and Tribal government will develop and post flood mitigation materials on the Emergency Services Section of their website. Posted information will include a list of the locality or Tribe's mitigation strategies and technical information that the local property owners can use to help alleviate flood damage to their properties. In 2020 the MPPDC launched a community Fight the Flood Program that connects property owners facing rising flood waters with tools and funding to contract with specialized businesses who can help evaluate, design, and build solutions. This program aims to educate the public on flood mitigation options to mitigate for flooding on their property.

Cost/Benefit Implications of Implementing Strategy 3.1.4
This strategy will have direct:

1. Benefits local residents with property in the flood plain about measures they can take to lessen flood damages to their property.
2. Costs of dedicating emergency management and public information officer's staff time to developing and distributing mitigation information.

Mitigation Strategy addresses the following hazards: hurricanes, winter storms, sea level rise, flooding, dam failure, and summer storms.

Strategy 3.1.5: Develop a public education campaign for residents living in the 100-year floodplain, especially those living on FEMA's list of SRL and RL properties, listing methods for them to decrease flood damage including the availability of any FEMA grant funds for elevation or relocation projects.

Strategy 3.1.5 will be undertaken in the following Middle Peninsula localities:

1. **Essex County,**
2. **Gloucester County,**

3. **King & Queen County,**
4. **Mathews County,**
5. **Middlesex County, and**
6. **Town of Tappahannock.**

Technical information should specify design considerations for how to handle all household utility components in flood prone areas as well as breakaway walls and venting options that allow automatic entry and exit of flood waters. As part of the MPPDC Fight the Flood Program property owners facing rising flood waters are connected to resources, tools, and funding to identify and advance flood mitigation activities in the region.

Cost/Benefit Implications of Implementing Strategy 3.1.5
This strategy will have direct:

1. Benefits local residents with property in the flood plain about measures they can take to lessen flood damages to their property.
2. Costs of dedicating emergency management and public information officer's staff time to developing and distributing mitigation information.

Mitigation Strategy addresses the following hazards: hurricanes, winter storms, sea level rise, flooding, and summer storms.

Strategy 3.1.6: Increase resident and emergency responder safety during severe winter ice storm events by developing a public education campaign to inform residents about the importance of keeping tree limbs away from their homes and electric lines.

Strategy 3.1.6 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna,**
9. **Town of West Point,**
10. **Rappahannock Tribe, and**
11. **Upper Mattaponi Tribe.**

By decreasing the potential for structures to incur damage during ice storms, this will allow the structures to remain occupied thereby lessening the number of emergency responder calls to remove occupants from damaged homes during times when roads are dangerous and/or impassable. Localities and Tribes will work with utility companies within the region to educate the public.

Cost/Benefit Implications of Implementing Strategy 3.1.6
This strategy will have direct:

1. Benefits for residents since they will be able to stay in their undamaged homes with electric lines intact which will allow for quicker restoration of electric service after severe winter storms.

2. Benefits for first responders with fewer risky fire and rescue calls on ice covered roads during and after severe weather events.
3. Costs of dedicating emergency management and public information officer staff time to develop and distribute ice storm related mitigation information on the locality or Tribe's website and other social media sites.

Mitigation Strategy addresses the following hazards: extreme temperatures, winter storms.

Strategy 3.1.7: Develop public information and inform property owners about the long range affects that sea level rise will have on low-lying property that they own.

Strategy 3.1.7 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **King & Queen County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Urbanna,**
8. **Town of West Point, and**
9. **Upper Mattaponi Tribe.**

The local governments noted above will provide information about the potential physical impacts of sea level rise on the Emergency Management Homepage of their jurisdictional website. Posted information will include areas in the locality that are expected to be affected, the time frame within which the impacts will be anticipated, the public infrastructure that may be impacted and what measures can be taken to mitigate future adverse impacts.

Cost/Benefit Implications of Implementing Strategy 3.1.7
This strategy will have direct:

1. Benefits for residents with property located in low lying areas about measures they can take to lessen future damages from this natural hazard.
2. Benefits to local governments with reduced damages to both public infrastructure and private property.
3. Cost in staff time to assemble, post and update website information on the locality's Emergency Management Homepage about sea level rise.

Mitigation Strategy addresses the following hazards: sea level rise.

Strategy 3.1.8 Promote a public education program to ensure that property owners protect their property by decreasing flammable forest fuels surrounding homes located in wooded settings.

Strategy 3.1.8 will be undertaken in the following Middle Peninsula localities and Tribes:

1. **Essex County,**
2. **Gloucester County,**

3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County, and**
7. **Rappahannock Tribe.**

Each of these local governments and Tribes will develop and post information about wildfire risks on the Emergency Management Homepage of their website. Posted information will include safety tips to minimize threats to homes/property that the Virginia Department of Forestry has developed and other existing wildfire reduction strategies that are available on related websites.

Mitigation Strategy addresses the following hazards: wildfires and drought.

Cost/Benefit Implications of Implementing Strategy 3.1.8
This strategy will have direct:

1. Benefits for local residents with property located in wooded areas to lessen the potential for fire damage to their homes and property.
2. Benefits to local and state fire responders with fewer calls to save structures and rescue residents in perilous situations.
3. Cost in staff time to assemble, post and update website information on the locality or Tribal Emergency Management Homepage.

Objective 3.2: Improve jurisdictional mapping capabilities to show the physical areas in their locality that may be affected by natural hazard events including storm surge areas from coastal storms.

Strategy 3.2.1: Incorporate the newly digitized local floodplain maps into each locality's GIS database after adoption by the local governing body, to the extent possible.

Strategy 3.2.1 will be undertaken in the following Middle Peninsula localities:

1. **Essex County,**
2. **Mathews County,**
3. **Town of Tappahannock,**
4. **Town of Urbanna, and**
5. **Town of West Point.**

Each county's GIS technician/consultant will incorporate the digitized floodplain map data into their system when a GIS system becomes available to the locality.

County planning/zoning officials will ensure that this floodplain data is readily available to property owners so that they are aware of the 100-year flood boundaries on their land.

Cost/Benefit Implications of Implementing Strategy 3.2.1
This strategy will have direct:

1. Benefits of more accurate flood plain data that will enable local officials to better guide development in flood prone areas.
2. Benefits for better data to incorporate into locality Comprehensive Plan Updates.

Costs of dedicating locality staff time in the GIS Department to incorporate the mapping products into the locality's IT system.

Strategy 3.2.2: When the All-Hazards Mitigation Plan is updated in the future, localities will refine and update data sets for general building stock and essential facilities; that will feed into a Level 2 HAZUS Assessment.

Strategy 3.2.2 will be undertaken in the following Middle Peninsula localities:

1. **Essex County,**
2. **Gloucester County,**
3. **King and Queen County,**
4. **King William County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna, and**
9. **Town of West Point.**

Cost/Benefit Implications of Implementing Strategy 3.2.2

This strategy will have direct:

1. Benefits to locality Zoning Administrators/Floodplain Managers/Building Officials with more precise costs when reviewing locality-wide mitigation projects and policies.
2. Costs to local government officials to contract with engineering firms to run HAZUS models since it is a more technically specific application than more localities in the Middle Peninsula can perform with their own staff capabilities.

Mitigation Strategy addresses the following hazards: hurricanes, winter weather, tornadoes, coastal/shoreline erosion, sea level rise, wildfires, high winds/windstorms, dam failure, droughts, lightning, earthquakes, shrink/swell soils, extreme temperatures, land subsidence/karsts, landslides, air quality, HAZMAT, and summer storms.

Goal 4: Ensure that the strategies developed in this plan are incorporated into other local planning documents, ordinances, policies, and procedures.

Objective 4.1: Develop an Implementation Plan within the AHMP Update that identifies the locality employees/officials who will be responsible for implementing each strategy that they will undertake, the local regulatory tools that the jurisdiction will use to implement the strategies, the resources that will be needed and the time frame within which the strategy will be completed.

Strategy 4.1.1: All Hazards: Adopt an Implementation Plan that includes one or more of the following:

1. **Assigns locality officials/employees with the ability and authority to implement or cause to be implemented the mitigation strategies that they have agreed to in the update;**
2. **Determines a low, moderate, and high priority for each strategy in the locality;**
3. **Establishes realistic timeframes for completing each strategy.**

4. **Appoints a natural hazard mitigation advisory committee to work with the Board of Supervisors, Planning Commission and Planning Staff to monitor progress on adopted strategies and to suggest additional mitigation strategies within the five-year review period of the AHMP Update by 2022 and the update of the jurisdiction's next Comprehensive Plan.**
5. **Consider including the mitigation strategies in an Implementation Matrix as part of the jurisdiction's next Comprehensive Plan update.**
6. **Amend the locality's Zoning Ordinance and Subdivision Ordinance to include natural hazard mitigation strategies as they relate to land development requirements, policies, and procedures.**
7. **Submit capital projects to the Planning Commission/Board of Supervisors for their consideration when they review the locality's Capital Improvement Program (CIP).**
8. **Seeks funding from various state and federal agencies for mitigation strategies that require an infusion of funds beyond what the jurisdiction can provide.**

Strategy 4.1.1 will be undertaken in the following Middle Peninsula localities and Tribe:

1. **Essex County,**
2. **Gloucester County,**
3. **King William County,**
4. **King & Queen County,**
5. **Mathews County,**
6. **Middlesex County,**
7. **Town of Tappahannock,**
8. **Town of Urbanna,**
9. **Town of West Point, and**
10. **Upper Mattaponi Tribe.**

Cost/Benefit Implications of Implementing Strategy 4.1.1

This strategy will have direct:

1. Benefits for the elected officials and locality staff since it gives them specific expectations with implementing the numerous strategies in the plan.
2. Costs to local governments have been kept within reason considering the limited financial resources and the many funding responsibilities that the rural Middle Peninsula jurisdictions face.

Mitigation Strategy addresses the following hazards: hurricanes, winter weather, tornadoes, coastal/shoreline erosion, sea level rise, flooding, wildfires, high winds/windstorms, dam failure, droughts, lightning, earthquakes, shrink/swell soils, extreme temperatures, land subsidence/karsts, air quality, HAZMAT, and summer storms.

Section 9 – Implementation Plan

Overview

The LPT assigned a **low, moderate, or high priority** to each of the strategies that have been proposed to lessen the adverse impacts from natural hazards in their respective communities. These priority ratings were assigned after reviewing the evaluation criteria listed at the beginning of Section 8 as well as their historical insight and knowledge of how their jurisdiction operates.

Strategies that were assigned a **higher priority** are ones that the LPT determined that their localities could implement:

1. in a timely manner,
2. with limited financial and staff resources, and
3. would reduce or eliminate losses to public infrastructure or private structures that have a history of damage from natural causes.

Strategies that were assigned a **moderate priority** are ones that the LPT determined that their localities could implement:

1. with a greater commitment of staff time,
2. a higher level of financial support from the locality, and
3. would increase public safety for a significant number of residents.

Strategies that were assigned a **low priority** are ones that LPT determined would:

1. require assistance from agencies/organizations outside of the direct control of the local government, and
2. have a lower potential to reduce or eliminate direct losses from natural hazards.

Please note that the Middle Peninsula localities and the federally recognized tribes used the above prioritization scale.

Public Survey (continued)

The final section of the public survey that was open to Middle Peninsula citizens from March 1st to March 15th, focused on understanding prioritizing projects and mitigating hazards. Respondents believed that mitigation actions protecting critical facilities, protecting, and reducing damages to utilities, and protecting private property were very important. The least important mitigation actions identified by respondents were preventing development in hazard areas and promoting cooperation among public agencies, citizens, non-profit organizations, and businesses. Next, when asked what actions have been on their property to reduce the risk of hazards 98 respondents purchased homeowners/renters insurance policies, 74 respondents have removed dead/dying trees or vegetation, 66 respondents have an alternate power supply, 56 respondents purchased and placed easily accessible fire extinguishers, 24 respondents purchased flood insurance, 20 respondents flood proofed their home, 20 respondents gained an alternative water supply, 17 respondents installed retrofits (i.e.. high impact windows or doors to withstand high winds; fire resistant siding, roofing or window screens, storm doors), 4 respondents installed fire breaks around their home, and 11 respondents have taken other actions.

Respondents also provided input regarding incentives that might encourage mitigation actions on their property and the majority of respondents favored property tax breaks, State tax incentives, insurance premium discounts, and grant funding. Finally, when asked what types of mitigation projects local government agencies should focus on to reduce disruption of services and to strengthen the community, they ranked the following from be most favorable to least favorable:

- Retrofit infrastructure
- Work on improving the damage resistance of utilities
- Retrofit and strengthen essential facilities
- Inform property owners of ways can mitigate damage to their properties
- Replace inadequate or vulnerable bridges and causeways
- Assist vulnerable property owners with securing funding to mitigate impacts on their property(s)
- Provide better information about hazard risk and high-hazard areas
- Buyout flood prone properties and maintain as open space.

Responsible Party

The local Emergency Services Coordinator/Emergency Manager (ESC/EM) will be the primary person responsible for implementing the strategies in this plan as adopted by their jurisdiction. The ESC/EM will need to work closely with the locality's Chief Administrative Officer (CAO) since many of the strategies will require Board of Supervisor or Town Council action.

Local governing body action will include implementation of new policies or ordinances as well as the possibility of amending existing ones. In addition, the governing body will need to approve grant applications for FEMA Hazard Mitigation Grant Funding and/or other funding sources.

The ESC/EM and CAO will need to work closely with the locality's Building, Planning and Zoning Department staff members as well as with FEMA and VDEM Disaster Mitigation staff in order to implement a successful and comprehensive hazards mitigation program.

Changes to the locality's zoning ordinance, comprehensive plan, building regulations and/or capital improvements programs can be anticipated. The CAO and ESC/EM in each locality will spearhead the effort to amend existing ordinances/polices or develop new ones to help implement mitigation strategies adopted for their locality in the MPAHMP update.

Communications

The ESC/EM will develop and implement their county-wide hazards mitigation outreach and public awareness campaigns using local media and other proven informational outlets in their locality – including their county websites that includes additional information about their Emergency Services Department.

Each locality's website will list and briefly describe the mitigation strategies that they have adopted in this plan and the timeframes by which they plan to implement them. Additionally, the website will include technical information and diagrams that residents can use to implement low-cost/low-tech construction measures to lessen potential future losses from natural hazards. Table 108 to 117 list the strategies that each jurisdiction has committed to for the next 5 years.

Table 108: Essex County - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comment
1.1.1	Moderate	Zoning	FEMA/landowners	By request	
1.1.2	Low	Building	Local	Yearly	
1.1.4	Low	Planning/ESC	Federal	By request	
1.1.5	High	BOS/VDOT	VDOT	In-progress	Currently participate in the Regional Hampton Road Evacuation Plan
1.1.6	High	BOS/VDOT	VDOT	In-progress	Currently participate in the Regional Hampton Road Evacuation Plan
1.1.8	High	Planning	Local	On-going	
1.1.9	High	Building/Zoning	Local	In-progress	
1.1.10	Low	Building	Local	Did not adopt	
1.1.11	High	Zoning	Local	On-going	
1.1.13	High	ESC/Planning	Local	In-progress	
1.1.15	High	Building/Wetlands	Local	In-progress	
1.1.19	Moderate	ESC/Planning	Local	On-going	
2.2.1	High	ESC	Local	In-progress	Mutual aid contract is renewed once a year
2.2.2	High	ESC	Local	In-progress	Mutual aid contract is renewed once a year
3.1.2	Low	Planning/VDOT	Local	Not started	Delayed due to limited funding and manpower
3.1.3	High	ESC/power co	Local	In-progress	
3.1.5	Moderate	ESC/MPPDC	Local/Regional	In-progress	The County will encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.6	High	ESC	Local	Ongoing & In-progress	
3.1.8	Low	ESC	Local	Ongoing	
3.2.1	High	Planning	Local	In-progress	
3.2.2	Low	ESC/Regional	State/Federal	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	ESC	Local	In-progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 109: Town of Tappahannock Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.1	Moderate	Zoning	FEMA/landowners	By request	
1.1.5	High	Town/County	VDOT	Delayed	Delayed because of VDOT; currently participate in the Regional Hampton Road Evacuation plan
1.1.7	High	Town	VDOT	Delayed	Delayed because of VDOT; currently participate in the Regional Hampton Road Evacuation plan
1.1.8	High	Planning	Local	On-going	
1.1.9	Low	Building/Zoning	Local	W/in 2 years	Delayed because of Essex County
1.1.10	Low	Building	Essex County	w/in 2 years	
1.1.11	Low	Zoning	Local	Not started	
1.1.15	Low	Building/Wetlands	Local	w/in 2 years	
1.1.19	Moderate	ESC/Planning	Local	On-going	
2.2.1	High	ESC	Local	In-progress	Mutual aid contract is renewed once a year
2.2.2	High	ESC	Local	In-progress	Mutual aid contract is renewed once a year
3.1.2	Moderate	ESC	n/a	On-going	
3.1.3	Moderate	ESC/power co	n/a	w/in 1 years	
3.1.5	Low	ESC/MPPDC	Local/Regional	In-progress	The Town will encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.6	Low	ESC	Local	Not started	
3.2.1	High	Planning	Local	w/in 2 years	
3.2.2	Low	ESC	State/Federal	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	ESC	Local	On-going	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 110: Gloucester County Locality Specific Plan of Action.

Strategy	Priority	Status	Plan to complete this strategy	Responsible Party	Funding Source	Schedule
1.1.1	Moderate	On-going	Continued progress on the strategy as part of the Hazard Mitigation Management Team combined with our Floodplain Management Committee and Program Public Information.	Hazard Mitigation Management Team and Floodplain Management Committee and Program Public Information	FEMA /Landowners	Strategy will be continual on an annual scheduled basis
1.1.2	Moderate	On-going	Same as above	Same as above	FEMA	Strategy will be continual on an annual scheduled basis
1.1.3	Moderate	On-going	Same as above	Engineering and Building & Grounds Departments	Federal grant	Strategy will be continual on an annual scheduled basis
1.1.4	High	On-going	Same as above	Engineering and Building & Grounds Departments	FEMA	Strategy will be continual on an annual scheduled basis as grants are available.
1.1.5	High	In-progress	Same as above	BOS/VDOT	VDOT	Strategy will be continual on an annual scheduled basis
1.1.6	High	On-going	Same as above	BOS/VDOT	VDOT	Strategy will be continual on an annual scheduled basis
1.1.7	Moderate	In-progress	Same as above	BOS/VDOT	VDOT	Strategy will be continual on an annual scheduled basis
1.1.8	Moderate	On-going	Same as above	Building Inspections and Planning & Zoning Departments	Local	Strategy will be continual on a bi-annual scheduled basis
1.1.10	Moderate	On-going	Same as above	Building Inspections and Planning & Zoning Departments	Local	Strategy will be continual on an annual scheduled basis
1.1.11	High	On-going	Same as above	Building Inspections and Planning & Zoning Departments	Local	Strategy will be continual on an annual scheduled basis
1.1.13	Moderate	On-going	Same as above	BOS/ Environmental Programs /Extension Service	Local	Strategy will be continual on an annual scheduled basis and updated on a regular basis.
1.1.15	Moderate	On-going	Continued progress on the strategy as part of the Hazard Mitigation Management Team combined with our Floodplain Management Committee and Program Public Information.	Wetlands Board Environmental Programs	Local	Strategy will be continual on an annual scheduled basis
1.1.18	Moderate	In-progress	Same as above	DIT / GIS	Local	Strategy will be continual on an annual scheduled basis
1.1.19	Moderate	In-progress	Same as above	BOS, Building Inspections, Planning & Zoning Departments, VDOT	Local	Strategy will be continual on an annual scheduled basis and revised when plans are reviewed
1.1.20	Moderate	In-progress	Same as above	Emergency Management, Hazard Mitigation Management Team & Floodplain Management Committee and Dam Owners	Local/Dam Owners	EAP for the Cow Creek Dam has recently been approved in 2021. Gloucester is currently working with a consultant to

						hold listening session and engagement exercises to better understand the impacts of Beaver Creek Dam.
1.3.1	High	In-progress	Same as above	Emergency Management, Hazard Mitigation Management Team and Floodplain Management Committee, Building Inspections and Planning & Zoning Departments	Local	
2.2.1	High	In-progress	Same as above	Emergency Management	Local	Strategy will be continual on an annual scheduled basis
2.2.2	High	In-progress	Same as above	Emergency Management	Local	Strategy will be continual on an annual scheduled basis
3.1.2	Moderate	On-going	Same as above	VDOT, Floodplain Management Committee and Program Public Information	VDOT & Local grants	Strategy will be continual on an annual scheduled basis and upgraded when VDOT make road improvements as approved by BOS.
3.1.3	Low	On-going	Same as above	Emergency Management, Hazard Mitigation Management Team and Floodplain Management Committee and Program Public Information	Dominion Power	Strategy will be continual on an annual scheduled basis as contract requires by Dominion Power.
3.1.4	Moderate	On-going	Same as above	Same as above	Program Public Information	Strategy will be continual on an annual scheduled basis
3.1.5	High	On-going	Same as above	Emergency Management, Hazard Mitigation Management Team and Floodplain Management Committee and Program Public Information	Program Public Information	Strategy will be continual on an annual scheduled basis and will apply for grants to fund PPI. Additionally, the County will encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.6	Moderate	On-going	Same as above	Emergency Management, Dominion Power	Dominion Power	Strategy will be continual on an annual scheduled basis
3.1.7	Low	On-going	Same as above	Middle Peninsula Planning District Commission	MPPDC	Strategy will be continual on an annual scheduled basis as part of PDC funding
3.1.8	Moderate	On-going	Same as above	Emergency Management, US Forestry Service, and Volunteer Fire Departments	USFS	Strategy will be continual on an annual scheduled basis and will seek grant opportunities.
3.2.2	Low	In-progress	Same as above	Middle Peninsula Planning District Commission	MPPDC	Strategy will be continual as the AHMP is scheduled for review 2021
4.1.1	High	In-progress	Same as above	Emergency Management and BOS	local	Strategy will be continual as the AHMP is scheduled for review 2021

Table 111: King and Queen County - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.5	Low	VDOT	VDOT	On-going	VDOT managed plan for bridge and traffic flow.
1.1.6	Moderate	BOS/VDOT	VDOT	On-going	Route 17 at Parkers Marina completed and now open. Road was raised. Also, items referred to VDOT as identified
1.1.8	Moderate	Zoning	Local	Every 2-years	Program reviewed by FEMA
1.1.11	Moderate	Building/Zoning	Local	On-going	
1.1.13	Moderate	ESC/Planning	VDOT	w/in 2-years	
1.1.15	Low	Building/Zoning	Local	On-going	Adopted new FIRM maps May of 2016 and new code. VE flood zone has a higher construction requirement. Also, promote public education and awareness through current floodplain management committee and through the Middle Peninsula Fight the Flood Program.
1.1.18	Moderate	Zoning	Local	On-going	Data updated on an as needed bases as dry hydrants are removed or added and new GIS data is provided, including new aerial imagery.
1.2.1	Low	ESC/CAO	Local	On-going	
2.2.1	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
2.2.2	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
3.1.2	Moderate	ESC	VDOT	Not Started	Roadways in VDOT system needs ditch cleanouts to prevent roadway flooding
3.1.3	Moderate	ESC/power co	Power Co.	In-Progress	REC does a great job of this
3.1.5	Low	ESC/MPPDC	Grant	On-going	The County will rely on the MPPDC for education campaigns for residents living in the 100-year floodplain. The MPPDC launched the Fight the Flood Program to engage residents impacted by flooding.
3.1.6	Moderate	ESC	n/a	Not started	
3.1.7	Low	MPPDC	Regional	Not Started	Rely on MPPDC for educational programs; FTF Program
3.1.8	Moderate	ESC	n/a	On-going	
3.2.2	Low	ESC	Local	In-Progress	On-going through GIS
4.1.1	High	ESC	Local	In-Progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 112: King William County - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.5	High	BOS/VDOT	VDOT	On-going	
1.1.6	Moderate	BOS/VDOT	VDOT	On-going	
1.1.12	Low	Zoning	Local	On-going	
1.1.13	Moderate	ESC/Planning	Local	Delayed	Delayed due to lack of funding and interest in this topic.
1.1.15	Low	Building/Wetlands	Local	On-going	
1.1.16	Moderate	Community Development	Local	Not Started	Delayed due to lack of funding
1.1.18	Low	GIS/Community Development	Local	On-going	GIS layer developed; Added stormwater BMP layer
1.1.19	Moderate	Community Development	Local	On-going	
2.2.1	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
2.2.2	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
3.1.2	Moderate	ESC	n/a	Not started	
3.1.3	Moderate	ESC/power co	n/a	w/in 1 years	
3.1.4	Moderate	ESC	n/a	Not started	Very little development around flood plains
3.1.5	Low	MPPDC	Regional	Not started	Very little development around flood plains; However, the County will rely on the MPPDC for education campaigns for residents living in the 100-year floodplain. The MPPDC launched the Fight the Flood Program to engage residents impacted by flooding.
3.1.6	Low	ESC	n/a	w/in 2 years	
3.1.7	Low	ESC/Community Development	Local	Not Started	Threat level of sea rise limited in this community.
3.1.8	Moderate	ESC	n/a	Not started	
3.2.2	Low	ESC	n/a	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	ESC	Local	In-progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 113: Town of West Point - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.1	Moderate	Planning	FEMA/land owners	Canceled	Have applied for funding over the last years and denied.
1.1.2	High	Building	Local	On-going	
1.1.3	Moderate	Planning	HRSD/Local	Completed	Relocated public works building to higher ground
1.1.5	Low	Planning	Regional	Not Started	
1.1.7	Moderate	VDOT/HRSD/Local	VDOT/HRSD/Local	On-going	Continue to evaluate status of roads
1.1.9	Moderate	Building/Zoning	Local	Not started	
1.1.10	Low	Building/Zoning	Local	On-going/ Completed	
1.1.11	Moderate	Zoning	Local	Ongoing	Review of zone and building applications
1.1.15	Low	Building/Wetlands	Local	In-progress	Encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
1.1.19	Low	Planning	Local	Not Started	Plan to work on techniques
2.2.1	High	Regional	Regional	On-going	Currently participate in mutual aid, no formal MOU's
2.2.2	High	Regional	Regional	On-going	Currently participate in mutual aid, no formal MOU's
3.1.2	Moderate	ESC	King William	On-going	King William Dispatch has the capability of doing this for the Town, if needed
3.1.3	Low	ESC/power co	n/a	Not started	
3.1.6	Moderate	ESC	Local	Not started	Work on public education through social media
3.1.7	Low	ESC	n/a	Not started	Work on public education through social media
3.2.1	High	Planning	n/a	On-going	Updated GIS information as received from FEMA
3.2.2	Low	ESC	Local	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	ESC	Local	In-progress	Adopted a Floodplain overlay district as a component of the Town's zoning ordinance

Table 114: Mathews County - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.1	High	Zoning	FEMA/landowners	In-progress/ ongoing	Four FEMA HMGP grants were awarded to the County for the elevation of houses for thirty-four repetitive loss properties and acquisition of three properties. The elevations and acquisitions in these four grants are in progress and are expected to be completed in 2017. Another FEMA HMGP grant for one severe repetitive loss property was used to elevate the house in 2014.
1.1.2	Low	Public Works	Local	Not Started	Delayed because of lack of funding
1.1.3	Moderate	Public Works	Local	Not Started	Delayed because of lack of funding
1.1.4	High	Town/County	VDOT	In-progress/ ongoing	FEMA HMGP funds were used to acquire five properties.
1.1.5	High	County	VDOT	Not Started	Recently added to this mitigation strategy
1.1.6	Low	County	VDOT	Not Started	Delayed because of lack of VDOT funding
1.1.8	High	Local/VDCR	Building/Zoning	Not Started	Delayed because of lack of VDOT funding
1.1.9	Low	Building/Zoning	Local	Not started	CRS was investigated by the previous Building Official. Board of Supervisors was not interested in joining at that time.
1.1.10	High	Building	Essex County	Delayed	Increased elevation requirements proposed for updated floodplain management ordinance, but not adopted. Potential to be addressed in the future.
1.1.11	High	Zoning	Local	In-progress/ ongoing	County's Building Official is enforcing adopted Floodplain Management Ordinance. Zoning amendments will be considered by the Planning Commission to address recurrent flooding after the five-year review of the Comprehensive Plan.
1.1.13	Low	Building/Wetlands	Local	Not started	No request has been made to the NRCS or Tidewater Soil and Water Conservation District for an inventory of farm pond dams.
1.1.15	Moderate	Building/Wetlands	Local	In-progress/ ongoing	The County's Wetlands Projects Coordinator and the Wetlands Board are promoting "Living Shorelines" as a shoreline erosion control method to property owners by utilizing information provided by VIMS and VMRC.
1.1.19	Moderate	Building/Zoning	Local	In-progress/ ongoing	Mitigation strategies will be included in the 5-year review of the Mathews County Comprehensive Plan by integrating natural hazard information and identifying hazard prone areas within the community.
2.2.1	High	ESC	Local	On-going	Formal MOA with regional partners.
2.2.2	High	ESC	Local	On-going	Formal MOA with regional partners.
3.1.2	Moderate	ESC	n/a	In-progress/ ongoing	The County encourages property owners to participate in its Outfall Ditch Maintenance Program. Local VDOT maintenance crews periodically clean ditches in their right-of-way. A Ditching Committee comprised of County residents was also formed to address this problem.
3.1.3	Low	ESC/power co	n/a	Not started	No request has been made to Dominion Power for information and guidance about the importance of keeping trees and brush away from power lines.

3.1.4	High	ESC	n/a	In-progress/ ongoing	The County's Building Official regularly posts information on the County's website regarding flood hazards.
3.1.5	High	ESC	n/a	In-progress/ ongoing	The County's Building Official and the Department of Planning & Zoning inform residents about FEMA HMGP grants to elevate their houses or acquire properties. Additionally, the County will encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.6	Low	ESC	n/a	Not started	Delayed because of lack of staff
3.1.7	High	ESC	local	In-progress/ ongoing	Department of Planning & Zoning staff provided this information to residents when the Comprehensive Plan was updated in 2010. On-going information has been provided to the Planning Commission regarding this topic in advance of the five-year review of the Comprehensive Plan.
3.1.8	Low	Public Works	Local	Not started	Delayed because of lack of staff
3.2.1	High	Zoning	Local	In-progress/ ongoing	Current FEMA flood zone maps are incorporated to our County's Online GIS.
3.2.2	Low	ESC	n/a	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	Building/Zoning/ESC	Local	Ongoing	Implement plans that address one or more of the eight

Table 115: Middlesex County - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.1	High	Zoning	FEMA/land owners	On-going	Managed by Staff on an on-going basis
1.1.2	Low	Building	Local	Not Started	Delayed because lack of staff; any concerns are forwarded to VDOT
1.1.4	Low	Building	FEMA	Not Started	Lack of staff to implement strategy
1.1.5	High	ESC/VDOT	Local	On-going	Utilize MP Evacuation Plan and Coordinate with VDOT
1.1.6	Low	BOS/VDOT	VDOT	On-going	Managed by VDOT
1.1.8	High	Zoning	VDOT	On-going	Active program; Ordinance recently readopted
1.1.9	Low	Building/Zoning	Local	Not Started	Delayed because lack of staff
1.1.11	High	Zoning	Local	On-going	Managed by staff on an on-going basis
1.1.13	Moderate	ESC/Planning		On-going	Coordinate with USDA Staff when required
1.1.15	High	Building/Wetlands	Local	On-going	Managed by Staff on an on-going basis
1.1.18	High	ES/GIS	Local	Not Started	Delayed because lack of staff
1.1.19	Moderate	BOS/Zoning/ES	Local	On-going	Coordinated by staff as required
1.2.1	Low	ESC/CAO	Local	Not Started	
2.2.1	High	ESC	Local	On-going	MP Emergency Management MOU
2.2.2	High	ESC	Local	On-going	MP Emergency Management MOU
3.1.2	Low	ESC	n/a	On-going	This occurs as needed; Public information via social media and handout material
3.1.3	Moderate	ESC/power co	n/a	On-going	Managed by Staff on an as needed basis; Continue to coordinate with power company
3.1.4	High	ESC	n/a	On-going	Managed by staff during public education deliveries; Public information via presentation, social media, and handout material
3.1.5	Low	ESC	n/a	On-going	This occurs as requested, *Public information via presentation, social media and handout material*. Additionally, the County will encourage citizens to participate in the Middle Peninsula Fight the Flood Program.
3.1.6	High	ESC	n/a	On-going	Managed by staff during public education deliveries; Public information via presentation, social media, and handout material
3.1.7	Low	ESC	Local	Not Started	Reactionary only; Public information social media and handout material
3.1.8	High	ESC	n/a	On-going	Managed by Staff during public education deliveries; Public information via presentation, social media, and handout material
3.2.2	Low	ESC	n/a	In-progress	Continue to update and file TIER II Reports.
4.1.1	High	ESC	Local	In-progress	Adopted a floodplain overlay district as a component of the County's zoning ordinance.

Table 116: Town of Urbanna - Locality Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.1	High	Zoning	FEMA/landowners	On-going	Greatly increased freeboard requirements in new floodplain ordinance beyond minimum requirement.
1.1.2	High	Building	Local	On-going	
1.1.3 (newly added strategy)	Moderate	Zoning/HRSD	Local	On-going	Replacing & relocating old sewage pumping stations with modern, more efficient systems and at better locations. Planting appropriate vegetation to shore up shoreline.
1.1.7 (newly added strategy)	Moderate	VDOT	VDOT/Local	On-going	Continue working with VDOT insisting they provide proper service for their roads. Work with property owners to have them take proper care of their drainage areas adjacent to the road.
1.1.9	Moderate	Building/Zoning	VDOT	Not Started	
1.1.11	High	Zoning	Local	On-going	Enforcement of all floodplain/zoning/building regulations in flood zones is actively pursued on an on-going basis.
1.1.15	High	Building/Wetlands	Local	On-going	Conducted jointly with Middlesex County
1.1.19	Moderate	Town/MPPDC	Local	On-going/In-progress	The Town and MPPDC integrates plans and policies when the opportunity arises.
2.2.1	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
2.2.2	High	ESC	Local	On-going	Currently participate in mutual aid, no formal MOU's
3.1.2	Low	ESC	n/a	On-going	Educational materials periodically placed on web site to encourage maintenance.
3.1.3	Low	ESC/power co	n/a	On-going	Town encourages Dominion line maintenance at every opportunity.
3.1.4	Low	Town/MPPDC	Local/Regional	In-Progress	Direct citizens to the Middle Peninsula Fight the Flood Program
3.1.6	Low	ESC	n/a	Delayed	Manpower constraints
3.1.7	Moderate	ESC	Local	In-progress	Materials are being developed for distribution
3.2.1	Moderate	Zoning/GIS	n/a	n/a	See Middlesex County
3.2.2	Low	ESC	n/a	In-progress	1. During the 2020 HAZUS completed by Dewberry the newest version of HAZUS software (version 4.2) 2. 2010 Census data was included in HAZUS. 2020 Census data will be used in the next AHMP update.
4.1.1	High	ESC	Local	In-progress	Adopted a Floodplain overlay district as a component of the County's zoning ordinance

Table 117: Rappahannock Tribe - Specific Plan of Action

Strategy	Priority	Responsible Party	Funding Source	Status	Comments
1.1.4	Low		FEMA Grants	Not Started	Will consider as needs are identified
1.3.1	Low	Director of Emergency Management	Grants	In-progress	• After funding secured, purchase Weather radios for Tribal Members. Subscribe to Alerting system for delivering information to members and area residents. Obtain generator for operations building. • Advanced warning systems (weather radios, reverse-911, Code Red type alerts) are being researched • Generator will be added to Operations building
2.2.1	Moderate	Director of Emergency Management	Grants	In-Progress	• Identify who has what resources in area as well as what capabilities we have. Obtain Mutual Aid Agreements covering the Rappahannock Tribal Service Area • The Rappahannock Tribe has plans on providing a 100-bed shelter
3.1.2	Low	Director of Emergency Management	Property Owner	Not Started	As problems areas are identified, property owners will be contacted and encouraged to perform required maintenance
3.1.4	Low	Director of Emergency Management	Grants	Not Started	As problems areas are identified, property owners will be contacted informed
3.1.6	Low	Director of Emergency Management	Grants	Not Started	Once we can locate and hire an Emergency Communications Coordinator, we will begin this and other public education programs
3.1.8	Low	Emergency Communications Coordinator	Grants	Not Started	Once we can locate and hire an Emergency Communications Coordinator, we will begin this and other public education programs

Table 118: Upper Mattaponi Tribe – Specific Plan of Action.					
Strategy	**Priority**	**Responsible Party**	**Funding Source**	**Status**	**Comment**
1.1.1	Low	Emergency Management	Grants	Not Started	As problems are identified by homeowners, reconstruction of properties will be investigated to determine eligibility for grant funding.
1.1.3	Low	Emergency Management	Grants	Not Started	As problems are identified, reconstruction of properties will be investigated to determine edibility for grant funding.
1.1.4	Low	Environmental Protection	Grants	Not Started	As problems are identified, conversion of properties will be investigated to determine eligibility for grant funding.
1.1.8	Low	Environmental Protection	Grants	Not Started	Conduct a bi-annual review of NFIP compliance
1.1.9	Low	Environmental Protection	Grants	Not Started	Investigate the FEMA CRS Program and how it can be implemented at UMIT
1.1.11	Low	Environmental Protection	Grants	Not Started	Review plans for new builds to ensure they are compliant in relevant regulations
1.1.12	Low	Environmental Protection	Grants	Not Started	Monitor plans for development in applicable areas
1.1.13	Low	Environmental Protection	Grants	Not Started	Begin partnerships with applicable agencies
1.1.15	Low	Environmental Protection	Grants	Not Started	Promote techniques when construction is occurring
1.1.18	Low	Environmental Protection	Grants	Not Started	Add data when GIS maps are created
1.1.19	Low	All Staff	Grants	Not Started	• Include mitigation strategies as plans and programs are being created • The Tribe is currently in the capacity building stage, and many plans and procedures are currently being developed.
1.3.1	Low	Emergency Management/Tribal Administrator	Grants	Not Started	• As problems are identified by homeowners, retrofitting of properties will be investigated to determine eligibility for grant funding. • Communication systems for advanced warning are being investigated • Plans to purchase additional generators for tribal buildings are being developed
2.2.1	Low	Emergency Management/ Tribal Administrator Legal	Grants	Not Started	Partner with local counties to develop MOUs for tribal service areas
3.1.2	Low	Emergency Management	Grants	On-going	• Create and distribute homeowner and renter flyer on proper home maintenance • Post reminders on home maintenance during storms • Encourage homeowners to maintain standard of care of their properties
3.1.4	Low	Emergency Management	Grants	Not Started	• Create and distribute homeowner and renter flyer on proper home maintenance • Post reminders on home maintenance during storms • Encourage homeowners to maintain standard of care on their properties
3.1.6	Low	Emergency Management	Grants	Not Started	• Create and distribute homeowner and renter flyer on proper home maintenance • Post reminders on home maintenance during storms

					• Encourage homeowners to maintain standard of care on their properties
3.1.7	Low	Emergency Management/ Environmental Protection	Grants	Not Started	Create and distribute homeowner and renter flyer on long-term effects of sea level rise
4.1.1	Low	Emergency Management	Grants	Not Started	• Establish Hazard Mitigation Planning Committee to assign strategies and develop timeline for action steps • Research and apply for grants as able to assist in emergency management and hazard mitigation

Local Plan Coordination and Integration

During this update the AHMP Steering added strategy 1.1.19 that focuses on integrating mitigation strategies into locality plans, policies, codes and programs across disciplines and departments. Here are examples of how Middle Peninsula localities are working toward this goal:

Essex County has developed zoning, subdivision, and floodplain ordinances that effectively reduce hazard impacts. Additionally, they have adopted flood insurance rate maps and have acquired land for open space and public recreation uses that assist in reducing hazard impacts.

Gloucester County is currently developing a Continuity of Operations Plan and has developed zoning, subdivision, floodplain, and natural hazard specific ordinances that effectively reduce hazard impacts. Additionally, they have adopted flood insurance rate maps and they have acquired land for open space and public recreation. The County has referenced the AHMP in the Comprehensive Plan, Floodplain Management Plan as well as the Open Space Management Plan. In conjunction with County plans, they have also adopted ordinances (zoning, subdivision, floodplain, and natural hazard) as well as flood insurance rate maps and have acquired land for open space and public recreates uses that assist in reducing hazard impacts.

King and Queen County has developed zoning, subdivision, floodplain, and natural hazard specific (ie. stormwater) ordinances that effectively reduce hazard impacts. Additionally, they have adopted flood insurance rate maps and they have acquired land for open space and public recreation (ie. conservation easements and Department of Forestry public forests) uses that assist in reducing hazard impacts.

King William County has included references to hazard mitigation in a variety of plans including the County Comprehensive Plan and the Local emergency Operations Plan. Additionally, King William County adopted ordinances (zoning, subdivision, floodplain, and natural hazard) as well as flood insurance rate maps that assist in reducing hazard impacts.

Mathews County adopted their Comprehensive Plan 2030 in January 2011 it has since been updated in 2017 and is currently being updated now that includes a chapter on hazard mitigation. Other plans that address hazards include the Capital Improvements Plan (Adopted in 2020), Local Emergency Operations Plan (Adopted December 2019), and the Transportation Plan. Additionally, Mathews County adopted ordinances (zoning, subdivision, floodplain, and natural hazard) as well as flood insurance rate maps and acquired land for open space through FEMA HMGP grant funding that assist in reducing hazard impacts.

Middlesex County has developed zoning, subdivision, and floodplain ordinances that effectively reduce hazard impacts. Additionally, they have adopted flood insurance rate maps to assist in reducing hazard impacts.

The ***Upper Mattaponi Tribe*** is currently in a capacity building stage, and existing plans, studies, reports, and technical information is limited. The plan takes into considerations all existing plans; however, as more plans are officially developed, they will be able to be used for future iterations.

In conjunction with integrating hazards and mitigation into local policies and plans, Middle Peninsula localities are interested in public involvement and several localities have specifically identified additional public participation steps to explore over the next five years:

- King William County- The County has established an All-Hazards Emergency Planning Committee to ensure that the public is involved.

- Gloucester County- The public will be involved with natural hazard planning through the Local Emergency Planning Committee (LEPC) and the Floodplain Management Committee (FMC). Both groups are open to the public and speak to hazard identification and mitigation strategies. Copies of The Plan will be made available at both County Public Libraries. Additionally, Gloucester County offers a variety of public outreach opportunities for their citizens. As participants in the CRS program the County has developed a Program for Public Information (PPI) that includes ongoing education about flooding.

- Town of Tappahannock – The Town will utilize monthly Town Council meetings to engage the public on hazard and mitigation topics.

- Mathews County- County will, from time to time, include pertinent information and opportunities for input on our website www.mathewscountyva.gov.

- King and Queen County- Copies of the AHMP will be made available at the Public Library. Comments from the public will be encouraged with a submission procedure outlined. The plan will be discussed at open public Board of Supervisors meetings when up for review. References to the Plan will be on the County's future Emergency Services Web Page.

Section 10 - Plan Adoption

The participating Middle Peninsula Localities held a public informational session during one of their regularly scheduled local governing board/council meetings seeking adoption of the plan. The federally recognized Tribes also presented this plan to their Tribal Governments for adoption.

After these informational sessions, the 12 governing bodies adopted the AHMP update by resolution on the dates noted below:

Locality	**Date of Adoption**
Essex County	April 12, 2022
Town of Tappahannock	May 9, 2022
Gloucester County	April 19, 2022
King and Queen County	May 9, 2022
King William County	May 23, 2022
Town of West Point	April 25, 2022
Mathews	April 26, 2022
Middlesex County	May 3, 2022
Town of Urbanna	May 14, 2022
Tribe	**Date of Adoption**
Pamunkey Tribe	September 1, 2022
Rappahannock Tribe	July 11, 2022
Upper Mattaponi Tribe	June 29, 2022

Resolutions from localities and tribes adopting the AHMP update are included in Appendix N.

Section 11 - Plan Maintenance

The annual monitoring, evaluating, and updating of the AHMP shall be a collaborative effort between the MPPDC and participating localities and tribes.

The first annual evaluation of the AHMP will be completed on the 1-year anniversary date, or close to the anniversary date, of FEMA's approval of the plan. MPPDC staff will reach out to LPT members (Locality and Tribal representatives) who actively participated in the development of the AHMP with an explanation of needed information and mitigation strategy status updates for the annual maintenance of the plan. For consistency purposes, a list of questions will be posed to the localities and tribes to focus the annual update. Questions presented to the LPT will include, but will not be limited to:

- Report any major disasters or hazard events.
- Document any new risk information or hazard data gathered.
- Review mitigation strategies and update progress on mitigation actions and noting new actions or project that were recently identified, funded, or underway. A table of mitigation strategies will be provided.
- Address needs required to implement mitigation strategy such as training, data, or funding.
- Review opportunities for integrating data and actions from the AHMP into other plans and programs.
- Identify any challenges where technical assistance from the State or FEMA Region 3 would be helpful.

Copies of the plan sections will be sent to points of contacts and changes will be directly made to the document in "red or blue text", when requested. If substantial changes are needed or if the jurisdiction wants the MPPDC to gather and update the requested information, the MPPDC will partner with jurisdiction at a burden rate of pay.

Upon completion of plan maintenance requests, MPPDC staff will inform regional partners of the AHMP updates. Additionally, MPPDC staff will post updates to the AHMP on the MPPDC website (www.mppdc.com).

The 2026 AHMP Update

Due to the limited jurisdictional staff and funds, it can be anticipated that the 9 Middle Peninsula localities and Tribes will undertake the 2026 update as a regional planning project; however, it is important to mention that if funding becomes available, the Upper Mattaponi Tribe has expressed interest in developing a standalone hazard mitigation plan. It can also be anticipated that MPPDC participating localities will ask MPPDC staff to seek funding from FEMA for this joint project. With or without partial FEMA grant funding, the update will be undertaken and completed within the 5-year mandated federal requirement.

Section 12: Appendices

Appendix A –
Signed Memorandum of Understandings

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
***Essex County, Virginia* (the County or Town) for the**
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 28 day of December, 2020.

BETWEEN:

Essex County, Virginia of 202 S. Church Lane, Tappahannock, VA 22560
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. Michael Lombardo, County Administrator
    Essex County, Virginia
    202 S. Church Lane, P.O Box 1079
    Tappahannock, VA 22560

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Essex County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

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Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 28th day of December, 2020.

Essex County, Virginia (Client)

Per: _____ (SEAL)
County Administrator

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

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Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA

Department of Emergency Management

9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter.

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

NOV 19 2020

Gloucester County
Administrator's Office

Telephone 804-693-4042 6489 Main Street, Gloucester, Virginia 23061 Fax 804-693-6004

November 10, 2020

Mr. Lewis L. Lawrence
Executive Director
Middle Peninsula Planning District Commission
P. O. Box 286
Saluda VA 23149

Dear Lewie,

The Gloucester County Board of Supervisors authorized the execution of the service agreement for the Middle Peninsula Planning District Commission Hazards Mitigation Plan Update at its November 4, 2020 meeting. Enclosed is a copy of the executed service agreement for your records. I am appointing the County staff members listed below to serve as Gloucester's representatives on the Middle Peninsula All Hazards Planning Team.

Brett Major
Emergency Management Coordinator
7478 Justice Drive
Gloucester VA 23061
804-693-2116
Email: bamajor@gloucesterva.info

Brent Payne
Director of Engineering Services
6515 Main Street
Gloucester VA 23061
804-693-1245
Email: bpayne@gloucesterva.info

Please let me know if you have any questions about these appointments.

Sincerely,

J. Brent Fedors
County Administrator

JBF:tc
Enclosure

cc: Brett Major, Emergency Management Coordinator
Brent Payne, Director of Engineering Services

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
Gloucester County for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 6TH day of November 2020.

BETWEEN:

Gloucester County, 6489 Main Street, Gloucester, VA 23061
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

- 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
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King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders

in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. County Administrator
    Gloucester County
    6489 Main Street
    Gloucester, VA 23061

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Gloucester County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

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Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this ~~fifteen~~ SIXTH day of NOVEMBER, 2020.

Approved as to form:

Edwin N. Thibeault

Gloucester County Attorney

Gloucester County (Client)

Per: _____ (SEAL)

~~Chairperson / Agent~~ CA

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)

Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e., Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

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2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA

Department of Emergency Management

9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled 'Middle Peninsula PDC Hazard Mitigation Plan Update.' The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter.

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeana Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
King and Queen County for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 30th of November, 2020.

BETWEEN:

King and Queen County, PO Box 177 King and Queen CH,
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

   Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

   All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. County Administrator
    King and Queen County
    PO Box 177
    King and Queen CH, 23085

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the King and Queen County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 30th day of November, 2020.

King and Queen County

Per: _____(SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA

Department of Emergency Management

9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

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Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

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FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

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If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

Digitally signed by APRIL D CUMMINGS
Date: 2020.04.30 10:17:51 -04'00'

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
King William County for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 16 day of November, 2020.

BETWEEN:

King William County, 180 Horse Landing Road #4, King William, Virginia 23086
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

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Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

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2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

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6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

Locality Share to be Split between all: $6,803

Essex	$972
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Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
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			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. County Administrator
    King William County
    180 Horse Landing Road #4
    King William, VA 23086

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the King William County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the King William County Board of Supervisors by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 16 day of November, 2020.

King William County (Client)

Per: _____ (SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA
Department of Emergency Management
9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

Digitally signed by APRIL D CUMMINGS
Date: 2020.04.30 10:17:53 -04'00'

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
Mathews County (the County) for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 17th day of November, 2020.

BETWEEN:

Mathews County of 50 Brickbat Road, Mathews, Virginia 23109
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

   Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

   All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. County Administrator
    Mathews County
    P.O. Box 839
    Mathews, VA 23109

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Mathews County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 17th day of November, 2020.

Mathews County (Client)

Per: Amy Dubois (SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
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- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA
Department of Emergency Management
9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC)
and Middlesex County (the County or Town) for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 1st day of December 2020.

BETWEEN:

Middlesex County of 877 General Puller Highway, Saluda, Virginia 23149
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

   Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

   All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. County Administrator
    Middlesex County
    877 General Puller Highway
    Saluda, Virginia 23149

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149
    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Middlesex County Board of Supervisors.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

        - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 1st day of December 2020.

Middlesex County (Client)

Per: _____ (SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
Town of Tappahannock **(the County or Town) for the**
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this ___17th_ day of _Dec._, 2020.

BETWEEN:

Town of Tappahannock of 915 Church Lane, Tappahannock, Virginia 22560
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

   Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804 (**rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

   All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. Eric S. Pollitt – Town Manager
    Town of Tappahannock
    915 Church Lane
    Tappahannock, Virginia 22560

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Town of Tappahannock Town Council.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this _17th__ day of _December_, 2020.

Town of Tappahannock (Client)

Per: ____Eric S. Pollitt__(SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: _____Lewis L Lawrence_____(SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA
Department of Emergency Management
9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015: the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter.

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
The Town of West Point (the County or Town) for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 20th day of November, 2020.

BETWEEN:

Town of West Point of P.O. Box 152, West Point, VA 23181
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. Town Manager
    Town of West Point
    P.O. Box 152
    West Point, VA 23181

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the West Point Town Council on November 19, 2020.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the West Point Town Council by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 20th day of November, 2020.

Town of West Point (Client)

Per: _____(SEAL)
Town Manager

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA

Department of Emergency Management

9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer, Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia Is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter.

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Service Agreement between
The Middle Peninsula Planning District Commission (MPPDC) and
Town of Urbanna for the
Virginia Department of Emergency Management (VDEM)
"Middle Peninsula PDC Hazards Mitigation Plan Update"
Grant Number FEMA-DR-4401-VA-003

THIS SERVICE AGREEMENT (the "Agreement") dated this 17th day of December, 2020.

BETWEEN:

Town of Urbanna of 45 Cross Street Urbanna, Virginia 23175
(The "Client")
AND
Middle Peninsula Planning District Commission of 125 Bowden Street, Saluda, Virginia 23149
(The "Contractor")

BACKGROUND:

A. The Client is of the opinion that the Contractor has the necessary qualifications, experience, and abilities to provide services to the Client.
B. The Contractor is agreeable to providing such services to the Client on the terms and conditions set out in this Agreement.
C. The Client recognizes the utility of a standard agreement to be used by member localities to ensure that mandates such as the Middle Peninsula multi-jurisdictional hazard mitigation plan are developed in accordance with Title 44 of the Federal Code of Regulations (CFR) Part 201.6; that the planning process is conducted in an open manner involving community stakeholders; that it is consistent with each participating jurisdiction's policies, programs and authorities; and that it is an accurate reflection of the community's values.

IN CONSIDERATION OF the matters described above and of the mutual benefits and obligations set forth in this Agreement, the receipt of sufficiency of which consideration is hereby acknowledged, the Client and the Contractor (individually the "Party" and collectively the "Parties" to this Agreement) agree as follows:

Services Provided

1. The Client hereby agrees to engage the Contractor to provide the Client with services (the "Services") necessary to update the regional Middle Peninsula PDC Hazard Mitigation Plan as described in Appendix A Project Scope of Work in accordance with:

    - 44 CFR Ch. 1 Section 201.6, Part a, which indicates that a local government MUST have a mitigation plan approved in order to receive HMGP project grants

and in order to apply for and receive mitigation project grants under all other mitigation grant programs.

- Disaster Mitigation Act of 2000 ("DMA 2K"), which is a key component of the Federal government's commitment to reduce damages to private and public property through mitigation activities. This legislation established the Pre-Disaster Mitigation ("PDM") Program and created requirements for the Post-Disaster Hazard Mitigation Grant Program ("HMGP"). This key piece of federal legislation is known as Public Law 106-390.

- DMA 2K, which requires local governments to develop and submit mitigation plans to qualify for PDM and HMGP funds. The Act requires that the plan demonstrate "the jurisdiction's commitment to reduce risk from natural hazards, serving as a guide for decision makers as they commit resources to reducing the effects of natural hazards.".

2. The Contractor recommends that the Client consult with legal counsel concerning questions related to the requirements of Disaster Mitigation Act of 2000 and 44 CFR Ch. 1 Section 201.6 and other related sections.

Term of Agreement

3. The term of this Agreement (the "Term") will begin on the date this Agreement is signed by both Parties and will remain in full force and effect until either FEMA approves the update to the Middle Peninsula PDC Hazard Mitigation Plan or by VDEM contract end date of October 12, 2022. The term of this Agreement may be extended with the written consent of the Parties. The Agreement may be terminated by either Party with 30 days written notice given to the other Party.

4. In the event that the Client breaches this Agreement, the Client shall remain liable to the Contractor for the costs of all services both rendered and agreed upon as set forth in paragraph 5 and 6 below. In the event that the Contractor breaches this Agreement, the Contractor will return to the Client any and all unspent monies received from the Client as set forth in Paragraph 5 and 6 below. The Parties acknowledge that no other damages, fees, or penalties shall be due one from the other as the result of any act or omission of either Party.

Performance

5. The Parties agree to fully cooperate and to do everything necessary to ensure that the terms of this Agreement take effect including the execution of additional documents should the need arise.

Compensation

6. For the services rendered by the Contractor as required by this Agreement, the Client will provide the following compensation as described below (as specifically applicable to Client locality, rounded up for ease).

Locality Share to be Split between all: $6,803

Essex	$972
Gloucester	$972
King and Queen	$972
King William	$972
Mathews	$972
Middlesex	$972
Urbanna	$324
Tappahannock	$324
West Point	$324
Total	**$6, 804** (rounded up for ease)

2 Year Federal Grant	Fema Funding	State Match Provided Non Fed Share	Local Share split between localties	Per County Match/Share	Per Town Match Share
$ 142,863	$ 108,848	$ 27,212	$ 6,803	$ 972	$ 324
			Year 1	$ 486	$ 162
			Year 2	$ 486	$ 162

All Such compensation shall be subject to appropriation by the Client.

7. The Contractor will invoice the Client for two annual payments of: **County $486 or Town $162 (as applicable).**

8. Project updates will be provided in the Middle Peninsula Planning District Commission monthly meeting packets.

9. In the event that a change order is requested, beyond the scope of services outlined in this Agreement, the Client will be charged on an hourly basis according to the approved Commission budget subject to the applicable provisions referenced in Dispute Resolution below (see section 20c). Appearances at local meetings, answering of telephonic questions and private meetings will be deemed change orders in the discretion of the Contractor provided such has been disclosed in writing, in advance to the Client.

Upon completion of the Services, a presentation will be made by the Contractor, at the request of the Client, at one local meeting of the Client's choice without additional compensation.

Reimbursement of Expenses

10. The Contractor will not be reimbursed for any expenses incurred in connection with this Agreement.

Employment Discrimination by Contractor Prohibited

11. a. The Contractor will not discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, disability, or other basis prohibited by state law relating to discrimination in employment, except where there is a bona fide occupational qualification reasonably necessary to the normal operation of the Contractor. The Contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

    b. The Contractor, in all solicitations or advertisements for employees placed by or on behalf of the Contractor, will state that such Contractor is an equal opportunity employer.

    c. Notices, advertisements and solicitations placed in accordance with federal law, rule or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

12. The Contractor will include the provisions of the foregoing paragraphs a, b and c in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

Drug-Free Workplace

13. The Contractor agrees to (i) provide a drug-free workplace for the Contractor's employees; (ii) post in conspicuous places, available to employees and applicants for employment, a statement notifying employees that the unlawful manufacture, sale, distribution, dispensation, possession, or use of a controlled substance or marijuana is prohibited in the Contractor's workplace and specifying the actions that will be taken against employees for violations of such prohibition; (iii) state in all solicitations or advertisements for employees placed by or on behalf of the Contractor that the Contractor maintains a drug-free workplace; and (iv) include the provisions of the foregoing clauses in every subcontract or purchase order of over $10,000, so that the provisions will be binding upon each subcontractor or vendor.

14. For the purposes of this section, *"drug-free workplace"* means a site for the performance of work done in connection with a specific contract awarded to a contractor in accordance with this chapter, the employees of whom are prohibited from engaging in the unlawful manufacture, sale, distribution, dispensation, possession or use of any controlled substance or marijuana during the performance of the contract.

Employment of Illegal Aliens

15. The Contractor agrees that it does not and shall not during the performance of this Agreement knowingly employ an unauthorized alien as defined in the federal Immigration Reform and Control Act of 1986.

Ownership of Intellectual Property

16. All information gathered during this project will remain public, unless prohibited from disclosure or exempted from required disclosure in accordance with state and federal law.

Capacity

17. In providing the Services under this Agreement, it is expressly agreed that the Contractor is acting as an independent contractor and not as an employee. The Contractor and the Client acknowledge that this Agreement does not create a partnership or joint venture between them.

Notice

18. All notices, requests, demands or other communications required or permitted by the terms of this Agreement will be given in writing and delivered to the Parties of this Agreement as follows:

    a. Town Administrator
    Town of Urbanna
    P.O. Box 179
    Urbanna, Virginia 23175

    b. Middle Peninsula Planning District Commission
    125 Bowden Street
    Saluda, VA 23149

    Or to such other address as any Party may from time to time notify the other.

Additional Clauses

19. This Agreement has been reviewed and approved via recorded vote of the Town of Urbanna Town Council.

Dispute Resolution

20. In the event a dispute arises out of or in connection with this Agreement, the Parties will attempt to resolve the dispute through friendly consultation.

    a. Once a final deliverable has been submitted by Contractor and approved by FEMA, the Contractor shall be deemed to have completed all services required under this Agreement.

    b. Once the scope of work has been completed and/or the product has received any necessary approvals, any changes made by the Client to the final product is "at its own risk". The Client assumes all responsibility for any modification, deviation, or change initiated outside of the agreed to scope of work.

    c. The Contractor has no contractual responsibility to advocate for, coordinate, or administer any local modifications beyond the services agreed to by the Contractor in accordance with the terms of this Agreement.

    - The Client may request an addendum to the contract for specific changes. The Contractor may consider the request from the Client and, if willing to perform the requested work, shall provide a response including a new cost estimate for consideration. Any addendum shall be authorized by the [Name of County/Town] [Board of Supervisors/Town Council] by Resolution outlining such changes to the Services.

Modification of Agreement

21. Any amendment or modification of this Agreement or additional obligation assumed by either Party in connection with this Agreement will only be binding if evidenced in writing signed by each Party or an authorized representative of each Party.

Time of the Essence

22. Time is the essence in this Agreement. No extension or variation of this Agreement will operate as a waiver of this provision.

Assignment

23. The Contractor shall not voluntarily or by operation of law assign or otherwise transfer its obligations under this Agreement without the prior written consent of the Client.

Entire Agreement

24. It is agreed that there is no representation, warranty, collateral agreement, or condition affecting this Agreement except as expressly provided in this Agreement.

Governing Law

25. It is the intention of the Parties to this Agreement that this Agreement and the performance under this Agreement, and all suits and special proceedings under this Agreement, be construed in accordance with and governed, to the exclusion of the law of any other forum, by the laws of the Commonwealth of Virginia, without regard to the jurisdiction in which any action or special proceeding may be instituted.

Severability

26. In the event that any of the provisions of this Agreement are held to be invalid or unenforceable in whole or in part, all other provisions will nevertheless continue to be valid and enforceable with the invalid or unenforceable parts severed from the remainder of the Agreement.

Waiver

27. The waiver by either Party of a breach, default, delay, or omission of any of the provisions of this Agreement by the other Party will not be construed as a waiver of any subsequent breach of the same or the provisions.

IN WITNESS WHEREOF the Parties have duly affixed their signatures under land and seal on this 10th day of December, 2020.

Town of Urbanna (Client)

Per: Holly Gailey (SEAL)
Chairperson / Agent

Middle Peninsula Planning District Commission (Contractor)

Per: Lewis L Lawrence (SEAL)
Executive Director

Appendix A:

Proposed Project Scope of Work

The Middle Peninsula Planning District Commission (MPPDC) will update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP) with the help of a Local Planning Team. Membership will be nominated by counties, towns, and other stakeholders (i.e.. Tribes, chamber of commerce, state agencies, the public, etc) in the Middle Peninsula. The plan will address several natural hazards, including but limited to hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, earthquakes, shrink-swell soils, extreme cold, extreme heat, landslides, land subsidence/karst, and tsunami.

The project includes the following components:

1. Planning Process
2. Risk Assessment
3. Hazard Mitigation Strategy
4. Hazard Mitigation Plan Maintenance Process
5. Hazard Mitigation Plan Adoption and Approval

Planning Team Responsibilities

Representatives on the Planning Team from participating jurisdictions must engage in the following planning process, including, but not limited to:

- Develop the Work Program and Schedule with the Planning Team
- Organize and attend regular meetings (virtual and/or in person) of the Planning Team. Attendance will be documented in the PDC monthly meeting packet.
- Assist the Planning Team with developing and conducting an outreach strategy to involve other planning team members, stakeholders, and the public, as appropriate to represent their Jurisdiction.
- Identify community resources available to support the planning effort, including meeting spaces, facilitators, and media outlets.
- Provide data and feedback to develop the risk assessment and mitigation strategy, including a specific mitigation action plan for their Jurisdiction.
- Submit the draft plan to their Jurisdiction for review.
- Work with the Planning Team to incorporate all their Jurisdiction's comments into the draft plan.
- Submit the draft plan to their respective governing body for consideration and adoption.
- After adoption, coordinate a process to monitor, evaluate, and work toward plan implementation.

Local Adoption

To be eligible for HMGP project grants (grants for a locality after a disaster), a local government must have a mitigation plan. Approval includes adoption by the participating jurisdictions.

Timeframe of Grant

This agreement and grant will be in effect from the date of signature by all parties, and will remain in effect through the duration of this project. Once a final deliverable has been submitted to and approved by the Client and the mandating entity, the Contractor shall be deemed to have completed all services required under this Agreement. The agreement may be terminated prior to that time by any Participating Jurisdiction by giving 30 days written notice.

Appendix B- Award Notices

JEFFREY D. STERN, Ph.D.
State Coordinator

CURTIS C. BROWN
Chief Deputy State Coordinator/
Chief Diversity and Inclusion Officer

JOHN NORTHON
Deputy State Coordinator – Disaster Services

ANDRES ALVAREZ
Deputy State Coordinator – Mission Support

COMMONWEALTH OF VIRGINIA
Department of Emergency Management
9711 Farrar Court, Suite 200
North Chesterfield, Virginia 23236
TEL 804.267.7600 TDD 804.674.2417 FAX 804.272.2046

June 3, 2020

Mr. Lewis Lawrence,
Executive Director -Middle Peninsula Planning District Commission
Saluda Professional Center
125 Bowden Street
Saluda, Virginia 23149

RE: Middle Peninsula PDC Hazard Mitigation Plan Update
FEMA-4401-DR-VA-003

Dear Mr. Lawrence:

I am pleased to notify you that the Federal Emergency Management Agency (FEMA) has approved the project titled "Middle Peninsula PDC Hazard Mitigation Plan Update." The funds have been obligated through the Hazard Mitigation Grant Program. Attached you will find the grant award package. Please read all documents carefully prior to initiating your project. As funded, the federal share is 75 percent of the total project costs.

Your project cannot begin until the authorized agent has signed the grant award package. No reimbursements will be made until the award package is signed and received by the Virginia Department of Emergency Management. Please sign the attached grant agreement and scan and email it to Debbie Messmer, state hazard mitigation officer. Congratulations on the approval of this project. If you have questions regarding this award or the implementation of your project, please contact Debbie Messmer at (804) 267-7732 or by e-mail at debbie.messmer@vdem.virginia.gov.

Sincerely,

Curtis C. Brown
Alternate Governor's Authorized Representative

Enclosures

CCB/RSC/djm

Saving lives through effective emergency management and homeland security.
"A Ready Virginia is a Resilient Virginia."

U.S. Department of Homeland Security
Region III
One Independence Mall, Sixth Floor
615 Chestnut Street
Philadelphia, PA 19106-4404

FEMA

April 30, 2020

Jeffrey D. Stern, Ph.D.
Governor's Authorized Representative
Virginia Department of Emergency Management
9711 Farrar Court
Richmond, Virginia 23236-3713

Re: Project Approval
Hazard Mitigation Grant Program (HMGP)
FEMA-4401-DR-VA-003

Dear Dr. Stern:

I am pleased to inform you that the project application, Middle Peninsula Planning District Commission Mitigation Plan Update 7% Project, submitted under FEMA-DR-4401-VA-003, has been approved.

The total amount for this project is $142,863 with a federal share of $108,848 ($102,045 for project costs and $6,803 for subrecipient management costs), and a non-federal share of $34,015; the federal share should be available in the SMARTLINK system. A copy of the Obligation Report is enclosed for your files.

The Period of Performance for this project ends on October 15, 2022. All grant award activities must be incurred during the performance period. The final product of this grant must be a FEMA approved plan. When submitting the updated plan, allow sufficient time for review, revision, and adoption.

Please provide this office with a Quarterly Progress Report thirty days after the end of each Federal fiscal year quarter

If you have any questions concerning this project, please contact John Schmierer, FEMA Region III Mitigation Project Officer at (267) 319-6322.

Sincerely,

APRIL D CUMMINGS

Digitally signed by APRIL D CUMMINGS
Date: 2020.04.30 20:17:53 -04'00'

April Cummings
Mitigation Division Director

cc: Debbie Messmer, State Hazard Mitigation Officer
Regeane Frederique, Grants Division Director

Appendix B –
List of Local Planning Team

AHMP Planning Team

Locality Representatives

KING WILLIAM
Steve Hudgins
Deputy County Administrator
shudgins@kingwilliamcounty.us
804-769-4990

Sherry Graham
Director of Planning
Sgraham@kingwilliamcounty.us
804-769-4978

GLOUCESTER
Brent Payne
Engineering Services Director
bpayne@gloucesterva.info
804-693-5480

Brett Major
Emergency Services Coordinator
bamajor@gloucesterva.info
(804) 693-1390

Jane Wenner
Assistant Emergency Management Coordinator
jwenner@gloucesterva.info
804 824 2711 Direct Line
804 693 1390 Office

KING & QUEEN
Donna Sprouse
Community Planner
dsprouse@kingandqueenco.net

Greg Hunter
Emergency Manager
ghunter@kingandqueenco.net

MATHEWS
Willie Love
Emergency Services Director
wlove@MathewsCountyVa.gov

James Knighton
Planner and Wetland Coordinator
jknighton@MathewsCountyVa.gov

MIDDLESEX
Dave Kretz
Director of Community Planning
d.kretz@co.middlesex.va.us

David Layman
Emergency Services Coordinator
d.layman@co.middlesex.va.us

ESSEX
Jimmy Brann
Chief of Emergency Service
jbrann@essex-virginia.org
804-443-4059

TOWN OF WEST POINT
Holly McGowan
Director of Community Development
hmcgowan@west-point.va.us
(804) 843-3563

John Edwards
Town Manager
jedwards@west-point.va.us
804-843-4364

TOWN OF TAPPAHANNOCK
Eric Pollitt
Town Manager
epollitt@tappahannock-va.gov

Frank Sanders
Zoning Administrator
fsanders@tapptown.com

TOWN OF URBANNA
Garth Wheeler
Town Administrator
g.wheeler@urbannava.gov
804-758-2613

Other Planning Team Members

Department of Conservation and Recreation
Angela Davis
Floodplain Program Planner
804-371-6135 office
804-278-7043 cell
Angela.Davis@dcr.virginia.gov

VDOT – Saluda Residency
Joyce McGowan
Saluda Engineer
joyce.mcgowan@vdot.virginia.gov

VDH Three Rivers
Matt Carpentier
Emergency Planner
matthew.carpentier@vdh.virginia.gov

National Weather Service (Wakefield):
Eric Seymour
Warning Coordination Meteorologist
Eric.seymour@noaa.gov

US Corps of Engineers:
Flood Plain Management Division
floodplainManagment@usace.army.mil

VOF
Ken Sterner
Senior Forester
ken.sterner@dof.virginia.gov

Pamunkey Tribe (Banks of Pamunkey River – 1200 acres)
Chief Robert Gray
Robert.Gray@pamunkey.org

Rappahannock Tribe (King & Queen County – 132 acres)
Chief G. Anne Richardson
arichardson@rappahannocktribe.org

Pat Morris
Tribe's grant writer and strategic planning assistant
pmorris@rappahannocktribe.org

Steven L. Nelson,
Director Emergency Management
Rappahannock Tribe
Direct: 804-533-5588
snelson@rappahannocktribe.org

Upper Mattaponi (King William Count – 32 acres)
Chief: W. Frank Adams
wfrankadams@verizon.net

VDEM Staff
Harrison Bresee
Chief Regional Coordinator – Region 5
Harrison.bresee@vdem.virginia.gov

Amanda Weaver
All Hazards Planner- Region 1
amanda.weaver@vdem.virginia.gov

Alexander Krupp
Hazard Mitigation Grants Administrator
alexander.krupp@vdem.virginia.gov

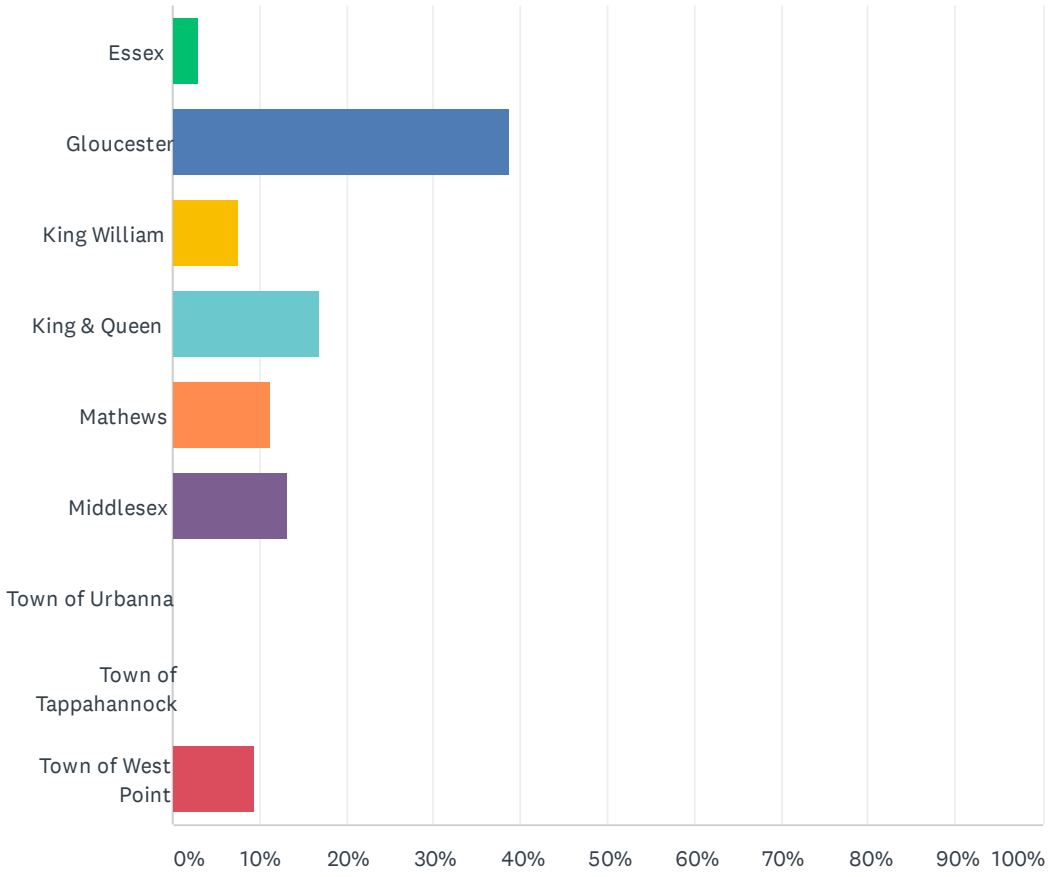
Other
Ann C. Phillips
Rear Admiral, US Navy
Special Assistant to the Governor for Coastal Adaptation and Protection
Ann.phillips@governor.virginia.gov

Jackie Rickards
Senior Planning Project Manager
Middle Peninsula Planning District Commission
jrickards@mppdc.com

Appendix C -
Public Survey Responses

Q1 From which Middle Peninsula Planning District Commission (MPPDC) area participating locality are you responding?

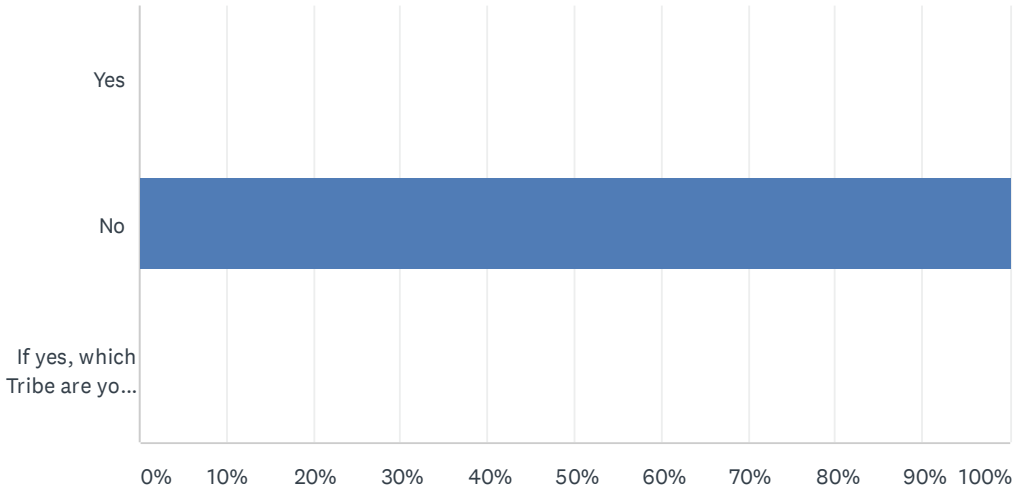
Answered: 106 Skipped: 0



ANSWER CHOICES	RESPONSES	
Essex	2.83%	3
Gloucester	38.68%	41
King William	7.55%	8
King & Queen	16.98%	18
Mathews	11.32%	12
Middlesex	13.21%	14
Town of Urbanna	0.00%	0
Town of Tappahannock	0.00%	0
Town of West Point	9.43%	10
TOTAL		106

Q2 Are you affiliated with a federally recognized tribe within the Middle Peninsula?

Answered: 106 Skipped: 0



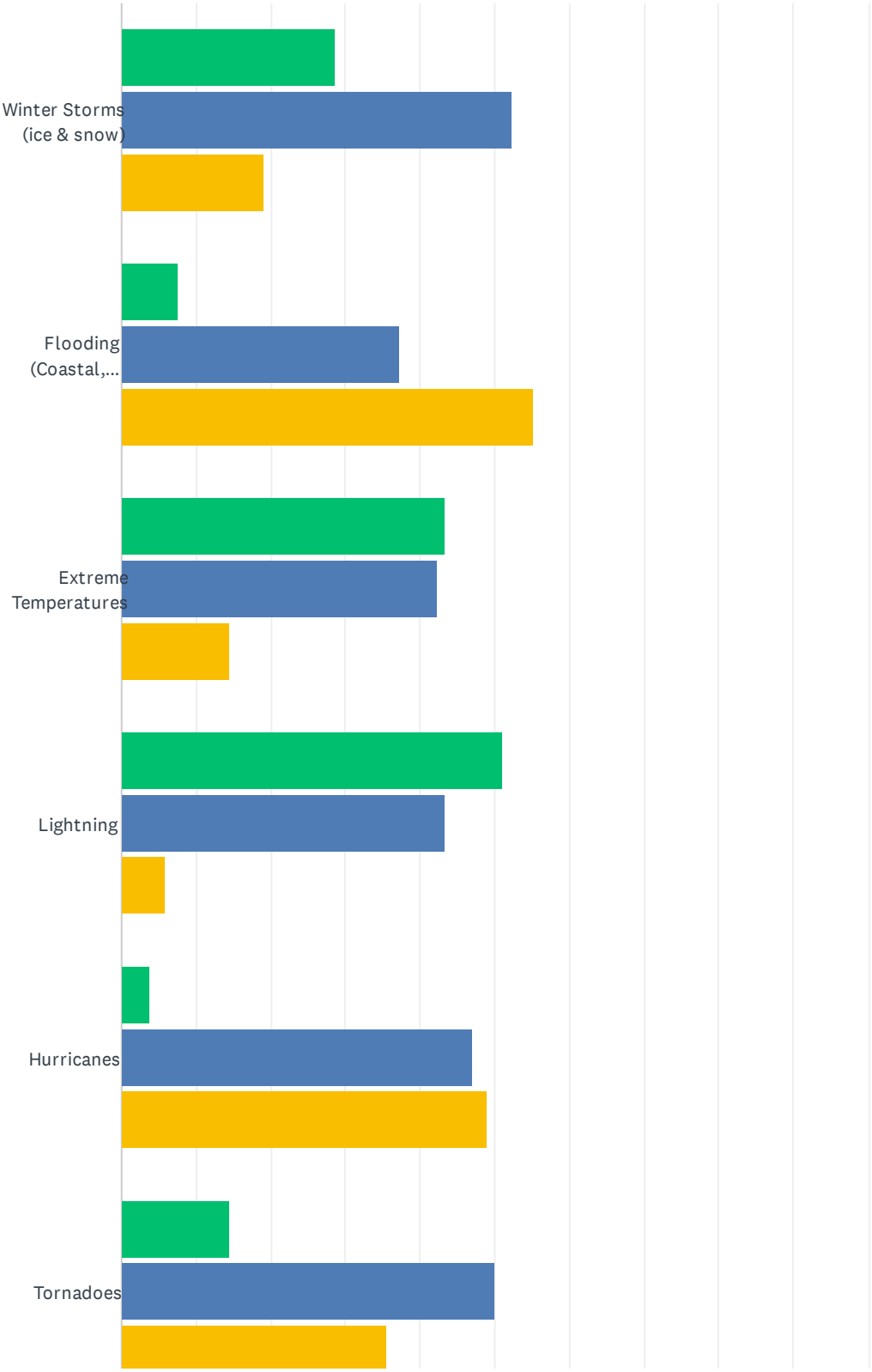
ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
No	100.00%	106
If yes, which Tribe are you affiliated with (Upper Mattaponi Tribe, Rappahannock Tribe, or Pamunkey Tribe):	0.00%	0
TOTAL		106

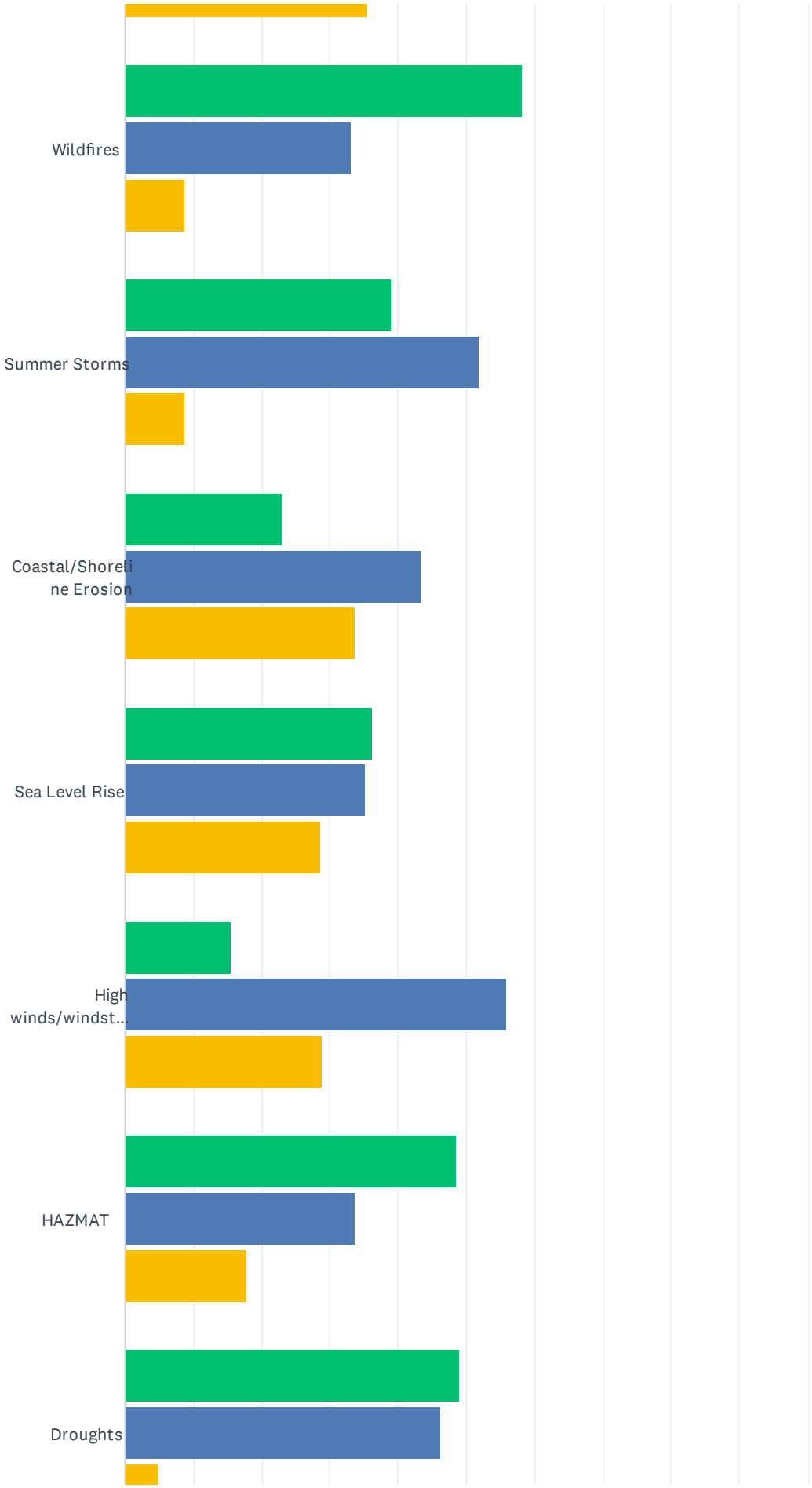
Q3 Please provide the zip code of your home address.

Answered: 105 Skipped: 1

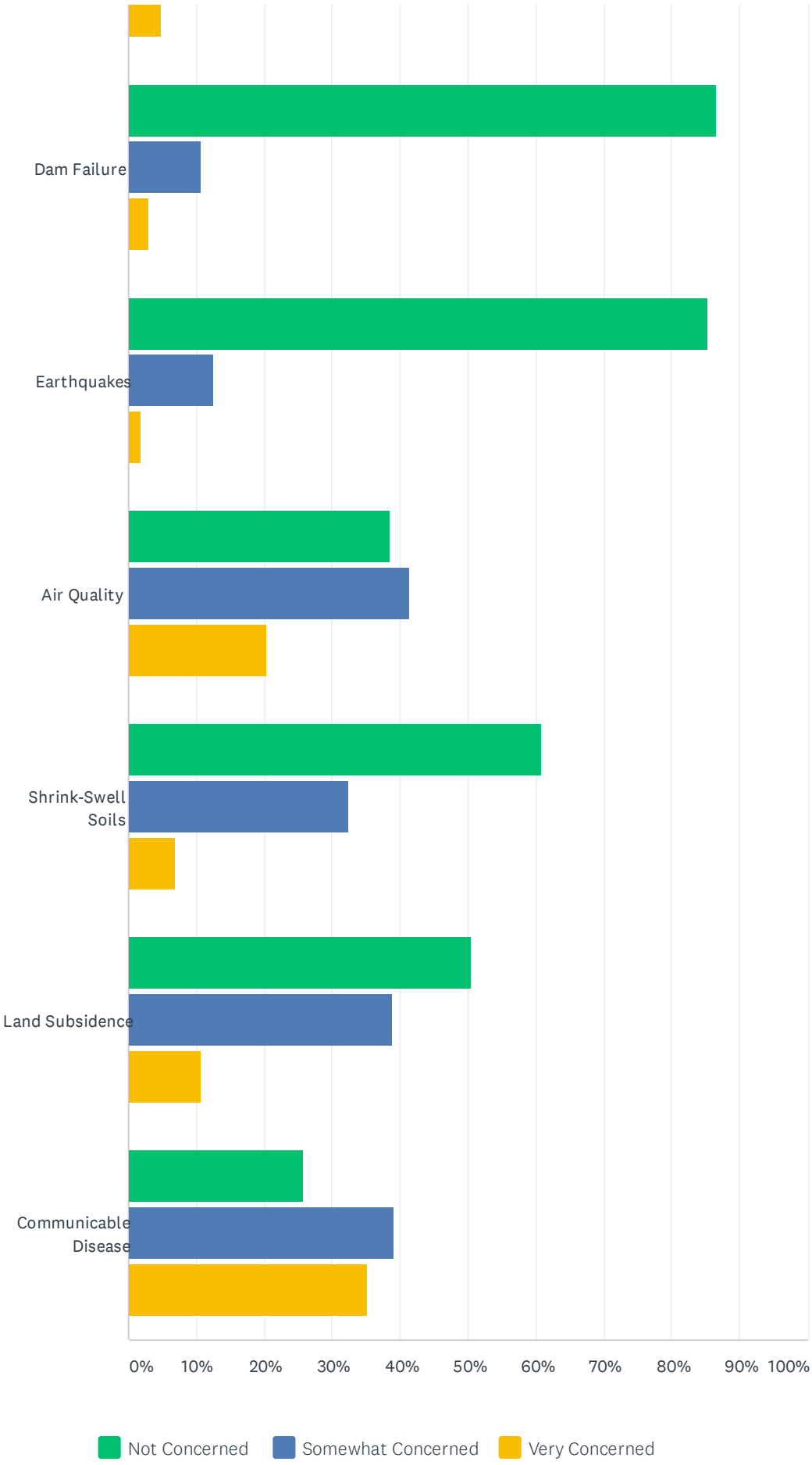
Q4 Below is the list of hazards proposed to be assessed in the 2021 AHMP update. How concerned are you about the following hazards affecting your community over the next 20 years?

Answered: 106 Skipped: 0




Wildfires
Summer Storms
Coastal/Shoreli
ne Erosion
Sea Level Rise
High
winds/windst...
HAZMAT
Droughts

441

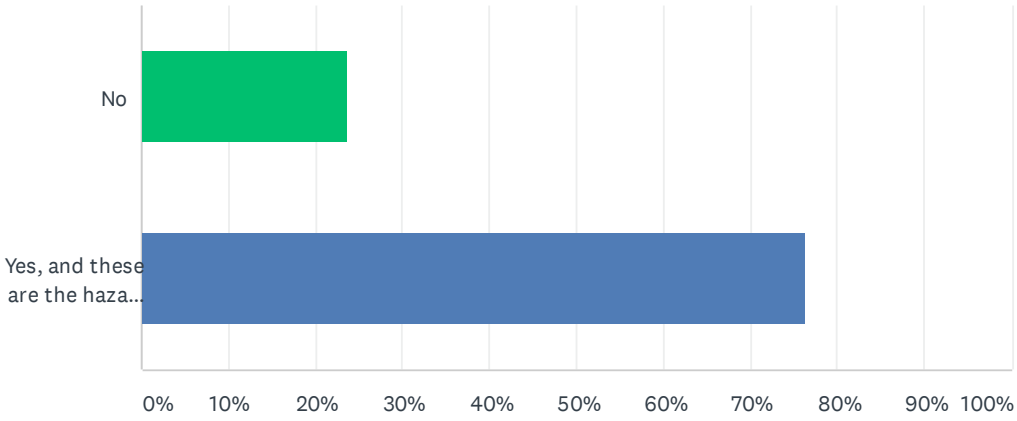

Dam Failure
Earthquakes
Air Quality
Shrink-Swell Soils
Land Subsidence
Communicable Disease
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
Not Concerned
Somewhat Concerned
Very Concerned

442

	NOT CONCERNED	SOMEWHAT CONCERNED	VERY CONCERNED	TOTAL
Winter Storms (ice & snow)	28.57% 30	52.38% 55	19.05% 20	105
Flooding (Coastal, riverine, ditch, & stormwater)	7.62% 8	37.14% 39	55.24% 58	105
Extreme Temperatures	43.27% 45	42.31% 44	14.42% 15	104
Lightning	50.96% 53	43.27% 45	5.77% 6	104
Hurricanes	3.85% 4	47.12% 49	49.04% 51	104
Tornadoes	14.42% 15	50.00% 52	35.58% 37	104
Wildfires	58.25% 60	33.01% 34	8.74% 9	103
Summer Storms	39.22% 40	51.96% 53	8.82% 9	102
Coastal/Shoreline Erosion	23.08% 24	43.27% 45	33.65% 35	104
Sea Level Rise	36.19% 38	35.24% 37	28.57% 30	105
High winds/windstorms	15.38% 16	55.77% 58	28.85% 30	104
HAZMAT	48.51% 49	33.66% 34	17.82% 18	101
Droughts	49.04% 51	46.15% 48	4.81% 5	104
Dam Failure	86.54% 90	10.58% 11	2.88% 3	104
Earthquakes	85.44% 88	12.62% 13	1.94% 2	103
Air Quality	38.46% 40	41.35% 43	20.19% 21	104
Shrink-Swell Soils	60.78% 62	32.35% 33	6.86% 7	102
Land Subsidence	50.49% 52	38.83% 40	10.68% 11	103
Communicable Disease	25.71% 27	39.05% 41	35.24% 37	105

Q5 While living in the Middle Peninsula Region, have you ever experienced, or been impacted by a hazard (see the list of hazards in question 4)?

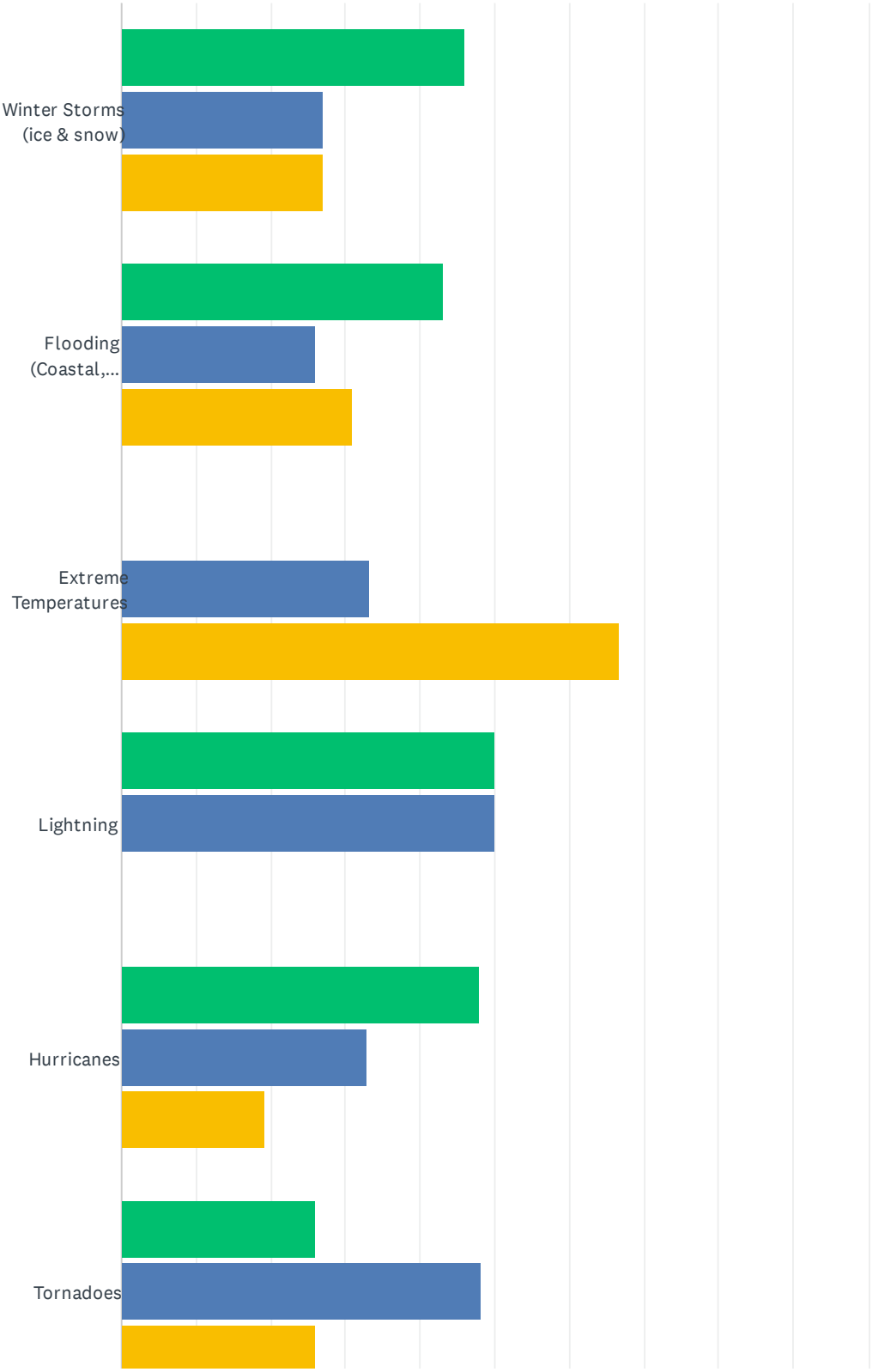
Answered: 106 Skipped: 0



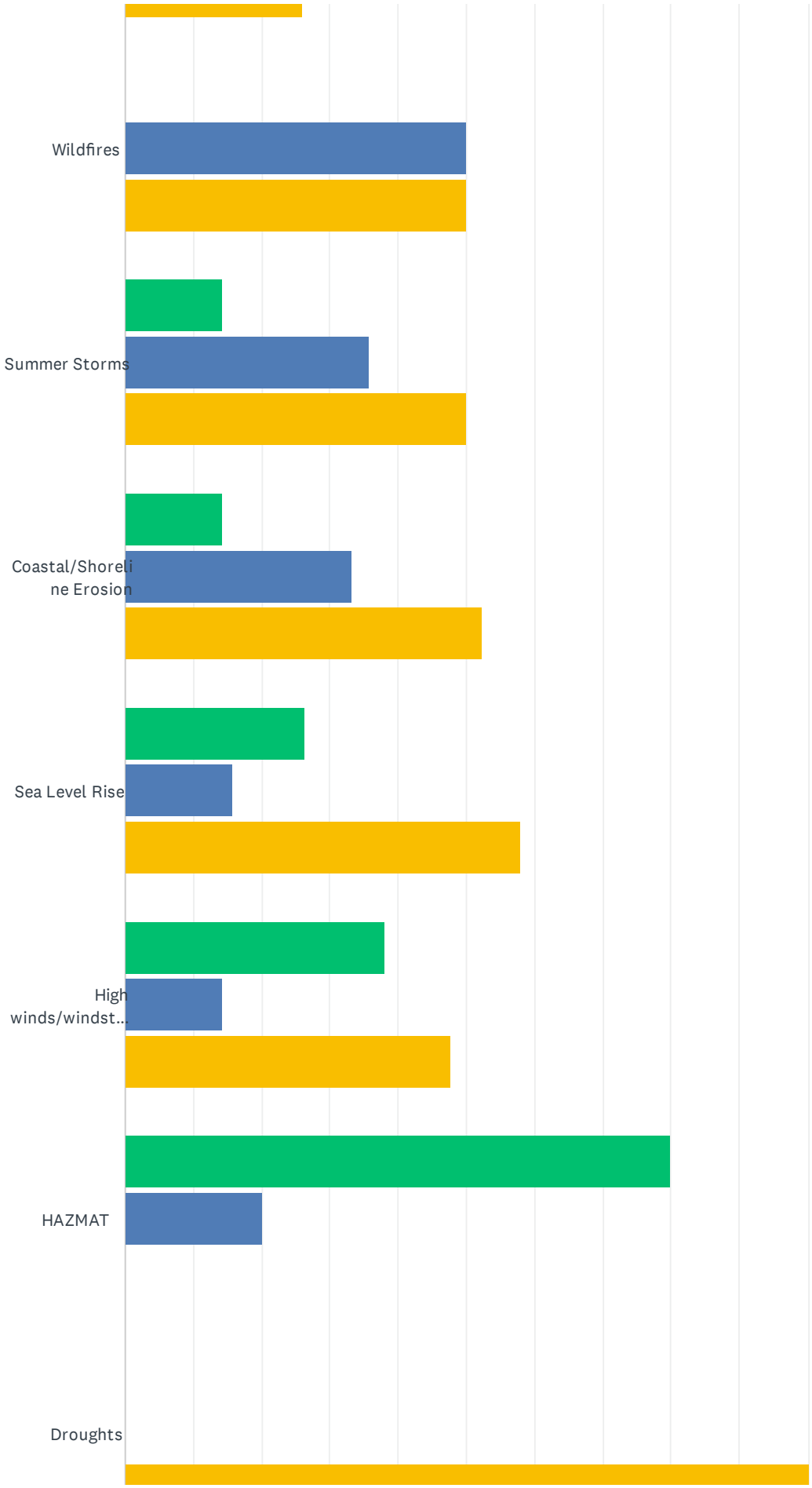
ANSWER CHOICES	RESPONSES	
No	23.58%	25
Yes, and these are the hazards I have been impacted by:	76.42%	81
TOTAL		106

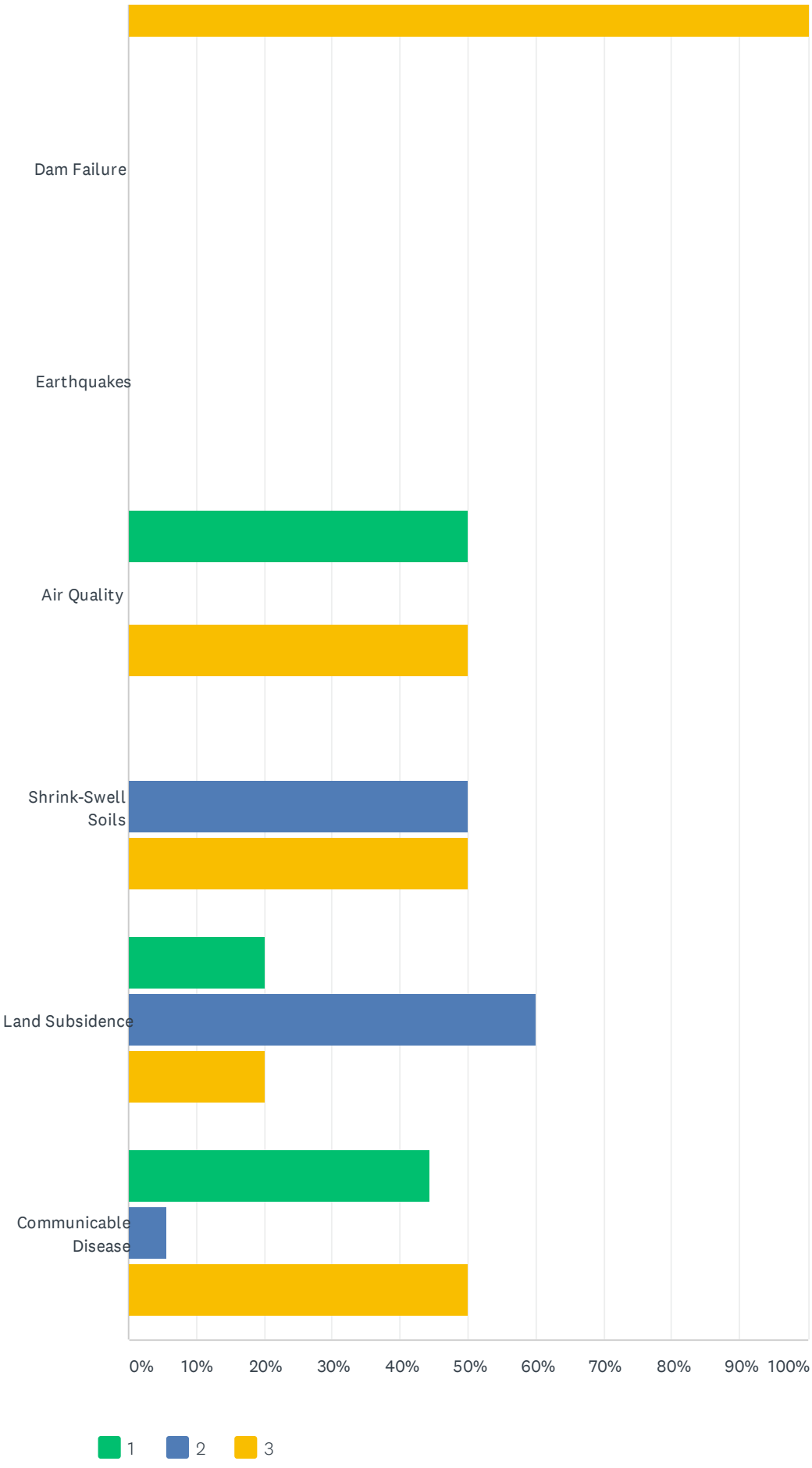
Q6 Please select the top three (3) hazards you think are the highest threat to your home or community? Of the top 3 hazards please rank from the highest threat (1) to the lowest (3).

Answered: 106 Skipped: 0



445

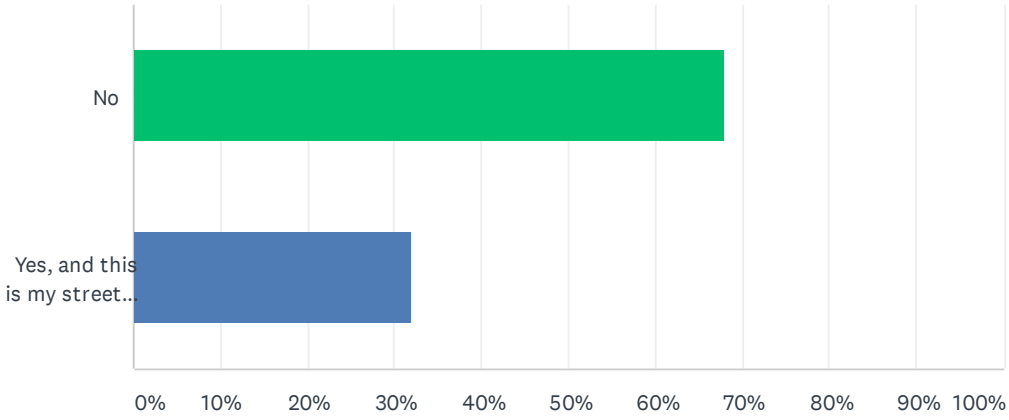

Wildfires
Summer Storms
Coastal/Shoreli
ne Erosion
Sea Level Rise
High
winds/windst...
HAZMAT
Droughts


Dam Failure
Earthquakes
Air Quality
Shrink-Swell Soils
Land Subsidence
Communicable Disease
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%
1
2
3

	1	2	3	TOTAL	WEIGHTED AVERAGE
Winter Storms (ice & snow)	45.95% 17	27.03% 10	27.03% 10	37	1.81
Flooding (Coastal, riverine, ditch, & stormwater)	43.10% 25	25.86% 15	31.03% 18	58	1.88
Extreme Temperatures	0.00% 0	33.33% 2	66.67% 4	6	2.67
Lightning	50.00% 1	50.00% 1	0.00% 0	2	1.50
Hurricanes	47.95% 35	32.88% 24	19.18% 14	73	1.71
Tornadoes	25.93% 7	48.15% 13	25.93% 7	27	2.00
Wildfires	0.00% 0	50.00% 2	50.00% 2	4	2.50
Summer Storms	14.29% 2	35.71% 5	50.00% 7	14	2.36
Coastal/Shoreline Erosion	14.29% 3	33.33% 7	52.38% 11	21	2.38
Sea Level Rise	26.32% 5	15.79% 3	57.89% 11	19	2.32
High winds/windstorms	38.10% 8	14.29% 3	47.62% 10	21	2.10
HAZMAT	80.00% 4	20.00% 1	0.00% 0	5	1.20
Droughts	0.00% 0	0.00% 0	100.00% 2	2	3.00
Dam Failure	0.00% 0	0.00% 0	0.00% 0	0	0.00
Earthquakes	0.00% 0	0.00% 0	0.00% 0	0	0.00
Air Quality	50.00% 2	0.00% 0	50.00% 2	4	2.00
Shrink-Swell Soils	0.00% 0	50.00% 1	50.00% 1	2	2.50
Land Subsidence	20.00% 1	60.00% 3	20.00% 1	5	2.00
Communicable Disease	44.44% 8	5.56% 1	50.00% 9	18	2.06

Q7 Does your street flood during rain events?

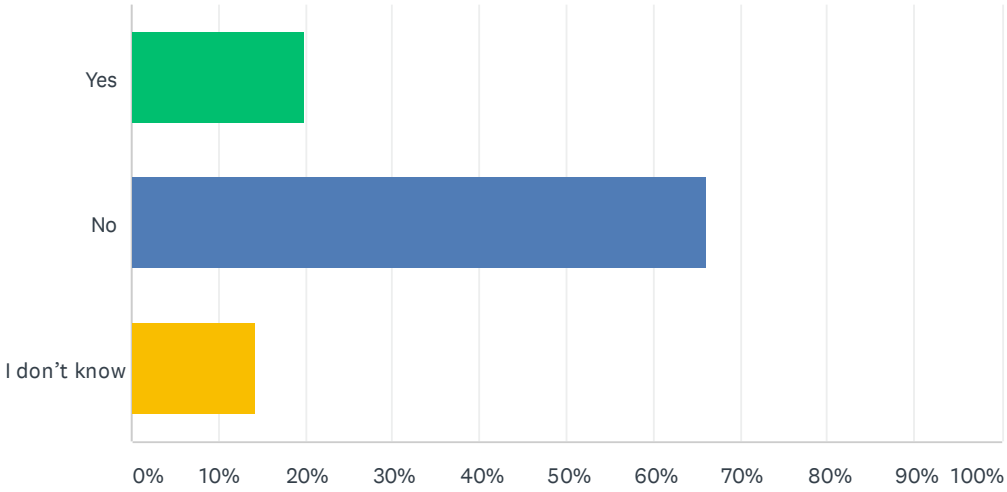
Answered: 106 Skipped: 0



ANSWER CHOICES	RESPONSES	
No	67.92%	72
Yes, and this is my street and county/town name:	32.08%	34
TOTAL		106

Q8 Is your home located in a floodplain?

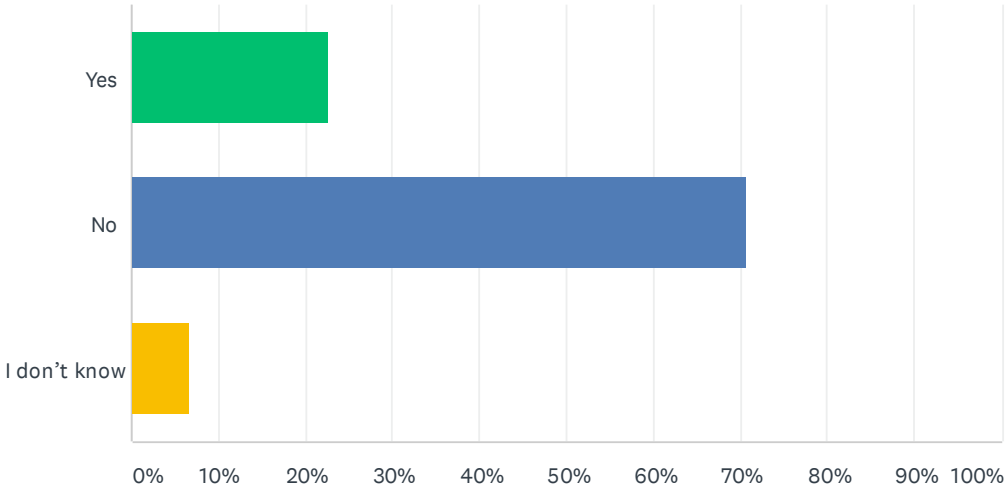
Answered: 106 Skipped: 0



ANSWER CHOICES	RESPONSES	
Yes	19.81%	21
No	66.04%	70
I don't know	14.15%	15
TOTAL		106

Q9 Do you currently have flood insurance?

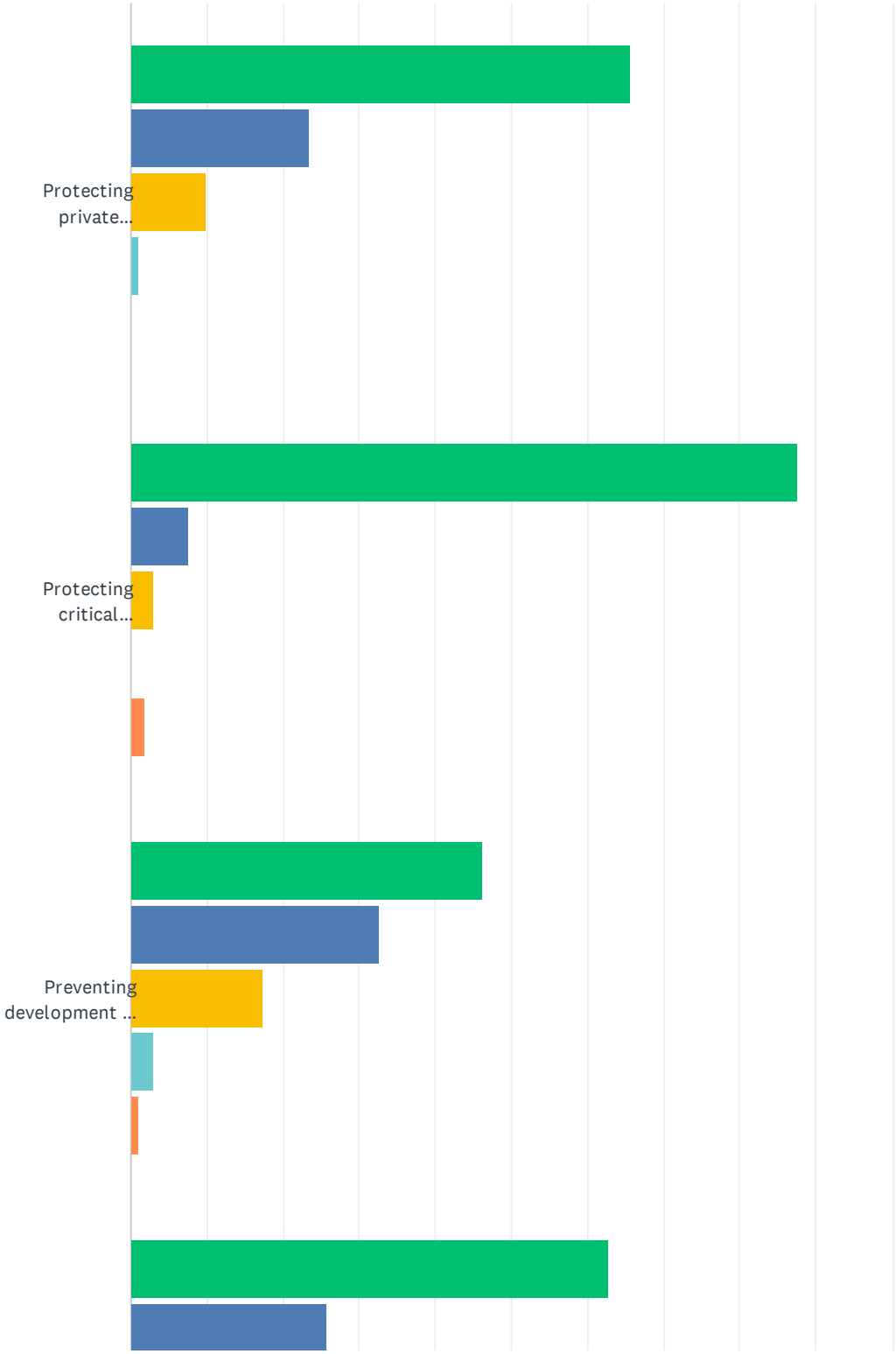
Answered: 106 Skipped: 0



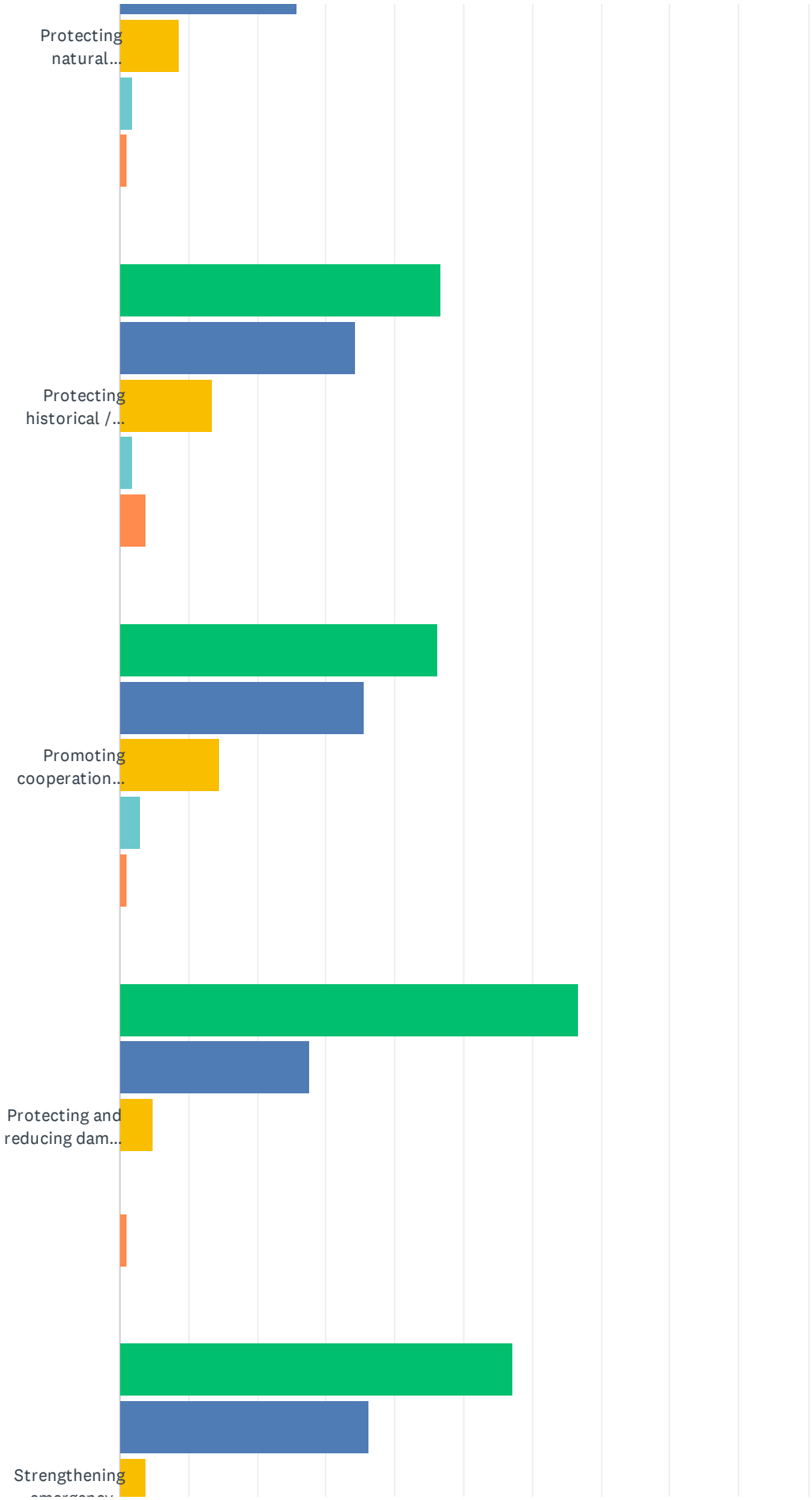
ANSWER CHOICES	RESPONSES	
Yes	22.64%	24
No	70.75%	75
I don't know	6.60%	7
TOTAL		106

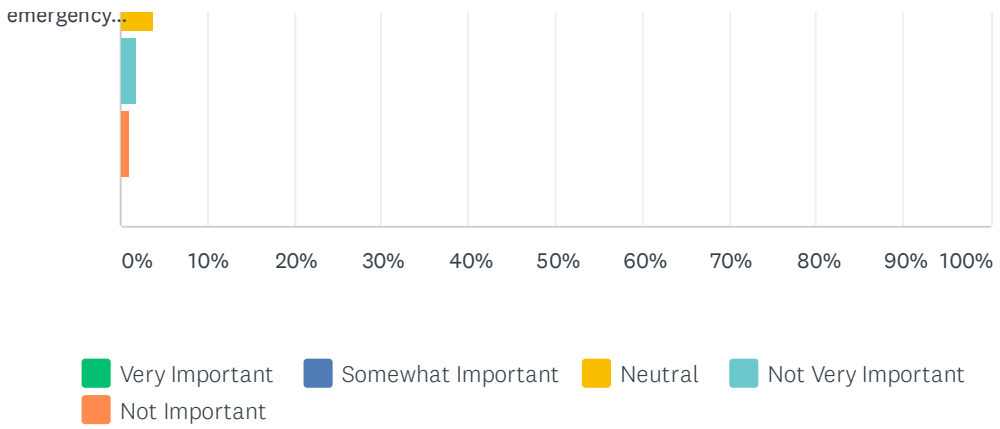
Q10 Hazards and disasters can have a significant impact on a community but planning for these events can help lessen the impact. The following statements will help us determine community priorities in planning for these hazards. Please tell us how important each one is to you.

Answered: 106 Skipped: 0



452

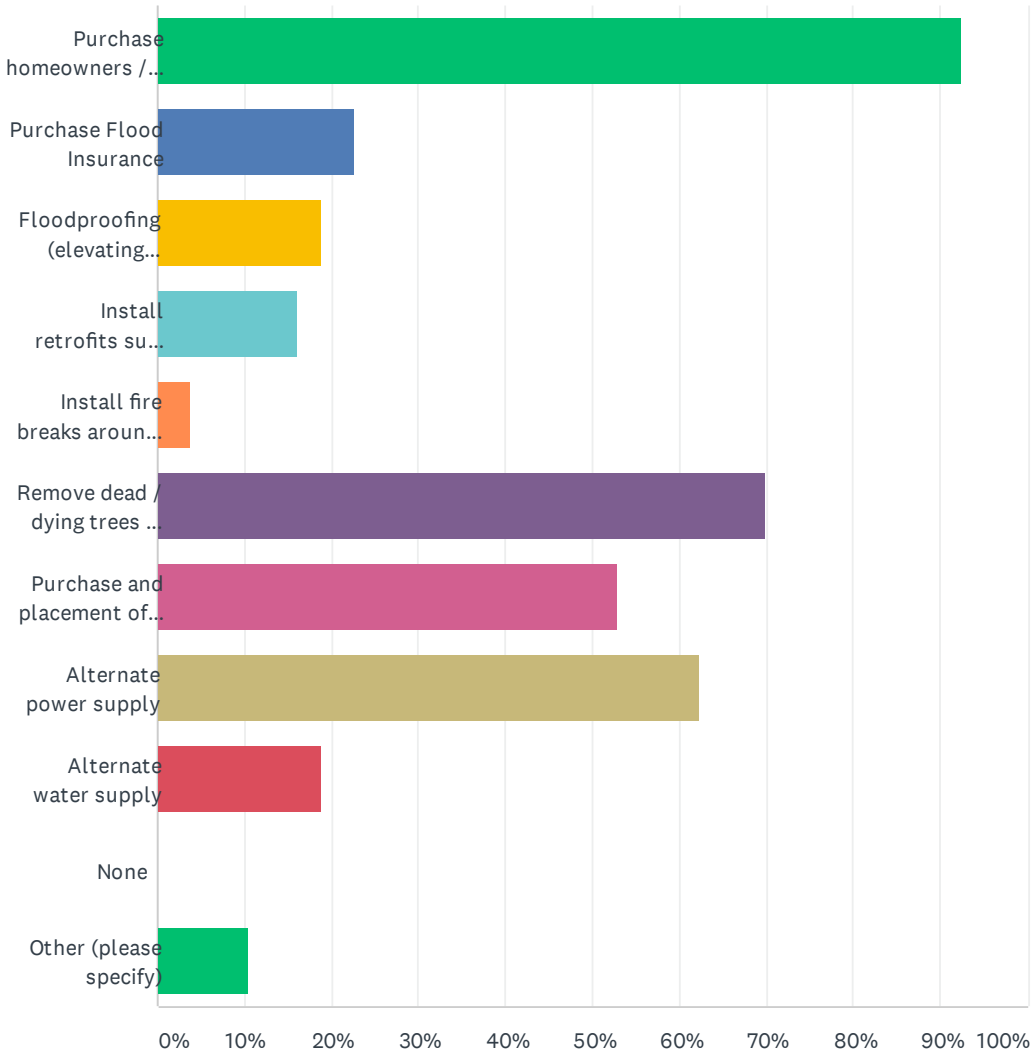

Protecting natural...
Protecting historical /...
Promoting cooperation...
Protecting and reducing dam...
Strengthening



	VERY IMPORTANT	SOMEWHAT IMPORTANT	NEUTRAL	NOT VERY IMPORTANT	NOT IMPORTANT	TOTAL
Protecting private property	65.69% 67	23.53% 24	9.80% 10	0.98% 1	0.00% 0	102
Protecting critical facilities (hospitals, transportation networks, fire stations)	87.62% 92	7.62% 8	2.86% 3	0.00% 0	1.90% 2	105
Preventing development in hazard areas	46.15% 48	32.69% 34	17.31% 18	2.88% 3	0.96% 1	104
Protecting natural environment	62.86% 66	25.71% 27	8.57% 9	1.90% 2	0.95% 1	105
Protecting historical / cultural landmarks	46.67% 49	34.29% 36	13.33% 14	1.90% 2	3.81% 4	105
Promoting cooperation among public agencies, citizens, non-profit organizations and businesses	46.15% 48	35.58% 37	14.42% 15	2.88% 3	0.96% 1	104
Protecting and reducing damage to utilities	66.67% 70	27.62% 29	4.76% 5	0.00% 0	0.95% 1	105
Strengthening emergency services (police, fire, ambulance)	57.14% 60	36.19% 38	3.81% 4	1.90% 2	0.95% 1	105

Q11 What actions have you taken to reduce risk for your house / apartment / property for potential hazards/disasters? (Please check all that apply)

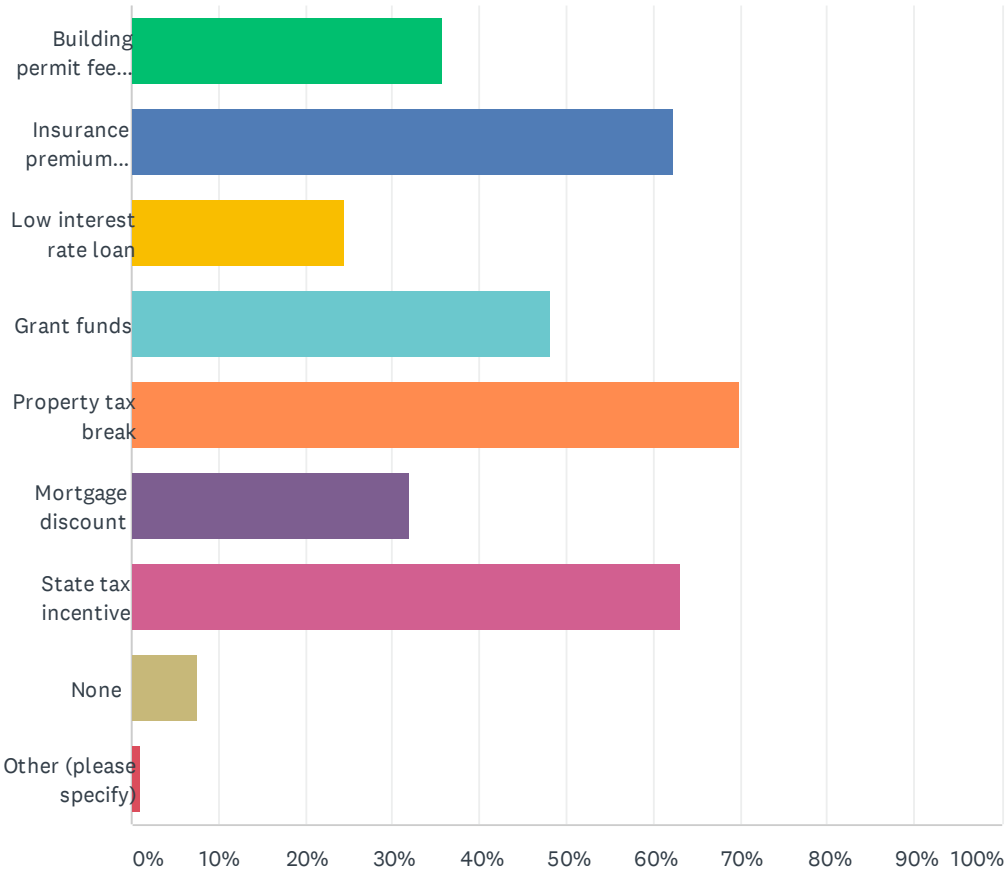
Answered: 106 Skipped: 0



ANSWER CHOICES	RESPONSES	
Purchase homeowners / renters insurance police	92.45%	98
Purchase Flood Insurance	22.64%	24
Floodproofing (elevating furnace, water heaters, electric panels)	18.87%	20
Install retrofits such as high impact windows or doors to withstand high winds; fire resistant siding, roofing or window screens; stormshelters, etc.	16.04%	17
Install fire breaks around home	3.77%	4
Remove dead / dying trees or vegetation	69.81%	74
Purchase and placement of easily accessible fire extinguishers	52.83%	56
Alternate power supply	62.26%	66
Alternate water supply	18.87%	20
None	0.00%	0
Other (please specify)	10.38%	11
Total Respondents: 106		

Q12 Which of the following incentives might encourage you to take actions to reduce risk to your home/apartment/property from hazards? (Please check all that apply)

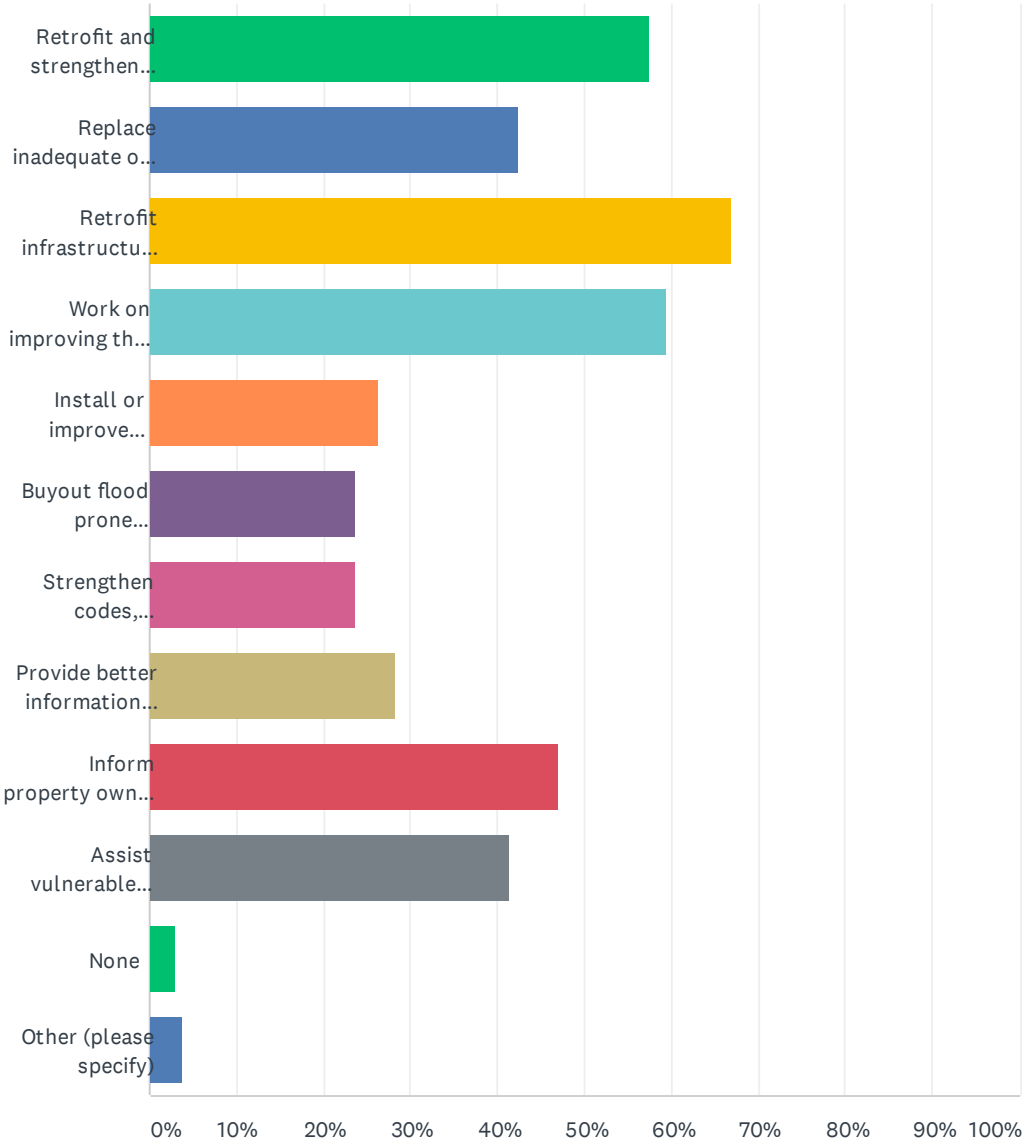
Answered: 106 Skipped: 0



ANSWER CHOICES	RESPONSES	
Building permit fee waiver	35.85%	38
Insurance premium discount	62.26%	66
Low interest rate loan	24.53%	26
Grant funds	48.11%	51
Property tax break	69.81%	74
Mortgage discount	32.08%	34
State tax incentive	63.21%	67
None	7.55%	8
Other (please specify)	0.94%	1
Total Respondents: 106		

Q13 Which of the following mitigation project types do you believe local government agencies should focus on to reduce disruptions of services and to strengthen the community (please check all that apply):

Answered: 106 Skipped: 0

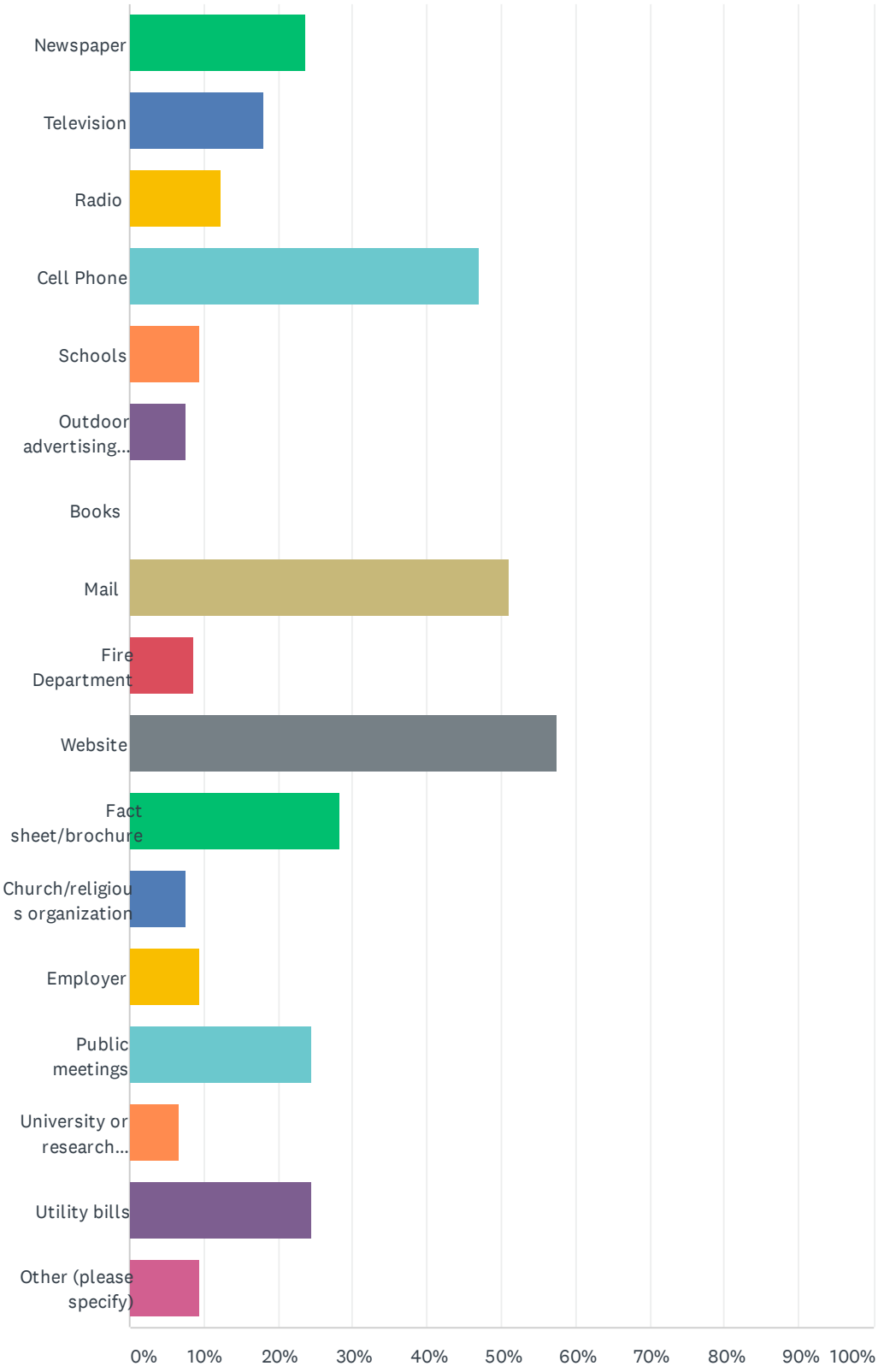


458

ANSWER CHOICES	RESPONSES	
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	57.55%	61
Replace inadequate or vulnerable bridges and causeways.	42.45%	45
Retrofit infrastructure, such as elevating roadways and improving drainage systems.	66.98%	71
Work on improving the damage resistance of utilities (electricity, communications, water / wastewater facilities, etc.).	59.43%	63
Install or improve protective structures, such as floodwalls or living shorelines.	26.42%	28
Buyout flood prone properties and maintain as open-space.	23.58%	25
Strengthen codes, ordinances, and plans to require higher hazard risk management standards.	23.58%	25
Provide better information about hazard risk and high-hazard areas.	28.30%	30
Inform property owners of ways they can mitigate damage to their properties.	47.17%	50
Assist vulnerable property owners with securing funding to mitigate impacts to their property(s).	41.51%	44
None	2.83%	3
Other (please specify)	3.77%	4
Total Respondents: 106		

Q14 What is the most effective way for you to receive information about how to make your household and home safer from natural disasters? (Please check all that apply)

Answered: 106 Skipped: 0


Newspaper
Television
Radio
Cell Phone
Schools
Outdoor advertising...
Books
Mail
Fire Department
Website
Fact sheet/brochure
Church/religious organization
Employer
Public meetings
University or research...
Utility bills
Other (please specify)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
Newspaper	23.58%	25
Television	17.92%	19
Radio	12.26%	13
Cell Phone	47.17%	50
Schools	9.43%	10
Outdoor advertising (billboards, etc.)	7.55%	8
Books	0.00%	0
Mail	50.94%	54
Fire Department	8.49%	9
Website	57.55%	61
Fact sheet/brochure	28.30%	30
Church/religious organization	7.55%	8
Employer	9.43%	10
Public meetings	24.53%	26
University or research institution	6.60%	7
Utility bills	24.53%	26
Other (please specify)	9.43%	10
Total Respondents: 106		

Q15 Please provide additional, hazard and mitigation related comments below:

Answered: 42 Skipped: 64

Q16 The Middle Peninsula Planning District Commission regularly sends out information to the community on various programs (i.e. Fight the Flood Program, Bay Direct, and MidPenRideShare). Please enter your email address here if you would like to be included in those announcements.

Answered: 37 Skipped: 69

Appendix D -
Invitations to Participate in the Plan

Jackie Rickards

From:	Jackie Rickards
Sent:	Monday, October 18, 2021 9:52 AM
To:	Donna Sprouse; Greg Hunter (ghunter@kingandqueenco.net); David Kretz; David Layman; Eric Pollitt; Frank Sanders; James Knighton; Willie Love; Brent Payne; 'jwenner@gloucesterva.info'; Sherry Graham; 'Steve Hudgins'; 'Garth Wheeler'; 'John Edwards'; 'Holly McGowan (hmcgowan@west-point.va.us)'; 'Leigh Mitchell'; 'Frank Adams'; 'Robert Gray'; 'Steven Nelson'; 'Jimmy Brann (jbrann@essex-virginia.org)'
Cc:	'Angela Davis'; Buford, Brandy; 'Harrison Bresee'; Amanda; 'Peaks, Ronald'; 'Eric Seymour'; 'Ken Sterner'; Tuck, Heather; 'Michael.Barber@dcr.virginia.gov'
Subject:	Draft AHMP - Ready for Public Comment!
Importance:	High

Good Morning Folks,
I have completed the draft of the regional All Hazards Mitigation Plan. It is currently posted on the MPPDC website (https://www.mppdc.com/articles/service_centers/mandates/All%20Hazards%20Mitigation%20Plan%20Update/DRAFT_AHMP_for%20Public%20Comment_RED.pdf and on the MPPDC facebook page for public comment. The public comment period opens today and will close on November 1st. Here is the announcement on the MPPDC Facebook page:

The Regional All Hazards Mitigation Plan (AHMP) for the Middle Peninsula is now available for public comment through November 1, 2021. View the draft AHMP here - https://bit.ly/3ARbcV1.
Comments? Email them directly to Jackie Rickards, Senior Planning Project Manager for the Middle Peninsula Planning District Commission, at jrickards@mppdc.com.
All nine Middle Peninsula localities, including Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex Counties and the Towns of Tappahannock, Urbanna, and West Point, participated in the plan's development and amendments. In addition to the nine regional localities, the federally recognized Indian Tribes in the region participated in the 2021 AHMP update.

Please share this information with your IT folks and have this posted on your social media pages and/or on your websites.

After the comment period ends I will let you know if we have received any comments. With public comments in hand I will go ahead and schedule a meeting with the LPT to discuss the comments and to make any necessary changes to the draft. If I do not receive any comments I will send you an email with the next steps.

If you have any questions about this please let me know.

Jackie

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION
Jackie Rickards
Senior Planning Project Manager
Middle Peninsula Planning District Commission
P.O.Box 286

This invitation to comment and provide feedback on the AHMP was sent to LPT participants including:

- Angela Davis, Virginia Department of Conservation and Recreation
- Brady Buford, Virginia Department of Conservation and Recreation
- Harrison Bresee, Virginia Department of Emergency Management
- Amanda Weaver, Virginia Department of Emergency Management
- Ronald Peaks, Virginia Department of Transportation
- Eric Seymour, National Weather Service
- Ken Sterner, Virginia Department of Forestry
- Heather Tuck, Virginia Department of Forestry
- Michael Barber, Virginia Department of Conservation and Recreation

Jackie Rickards

From: Jackie Rickards
Sent: Friday, March 4, 2022 10:45 AM
To: LCFEMS@louisa.org; Bateman, John; dnunnally@co.caroline.va.us; kchale@newkent-va.us; klleduc@newkent-va.us; planning@hanovercounty.gov; hmothershead@co.richmond.va.us; dlee@westmoreland-county.org; dlee@westmoreland-county.org
Subject: Middle Peninsula Regional All Hazards Mitigation Plan - Neighboring Communities Review Request

Importance: High

Good Morning,
With funding through FEMA and the Virginia Department of Emergency Management, Middle Peninsula Planning District Commission (MPPDC) staff has worked with Middle Peninsula localities over the past year to update the Middle Peninsula Regional All Hazards Mitigation Plan (AHMP). The AHMP evaluates hazards that may impact the region and proposes mitigation strategies to reduce the impacts of future hazardous events.

According to 44 CFR §201.6(b)(2) of the mandate, *The planning process shall include an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, and agencies that have the authority to regulate development, as well as businesses, academia and other private and non-profit interests to be involved in the planning process.* Therefore, as you are a neighboring community I am sending you the current draft of the Middle Peninsula Regional All Hazards Mitigation Plan to review. Please take some time to review this document and provide feedback no later than **Friday, March 18, 2022.**

If you have any questions about this endeavor or if you would like more information feel free to contact me.

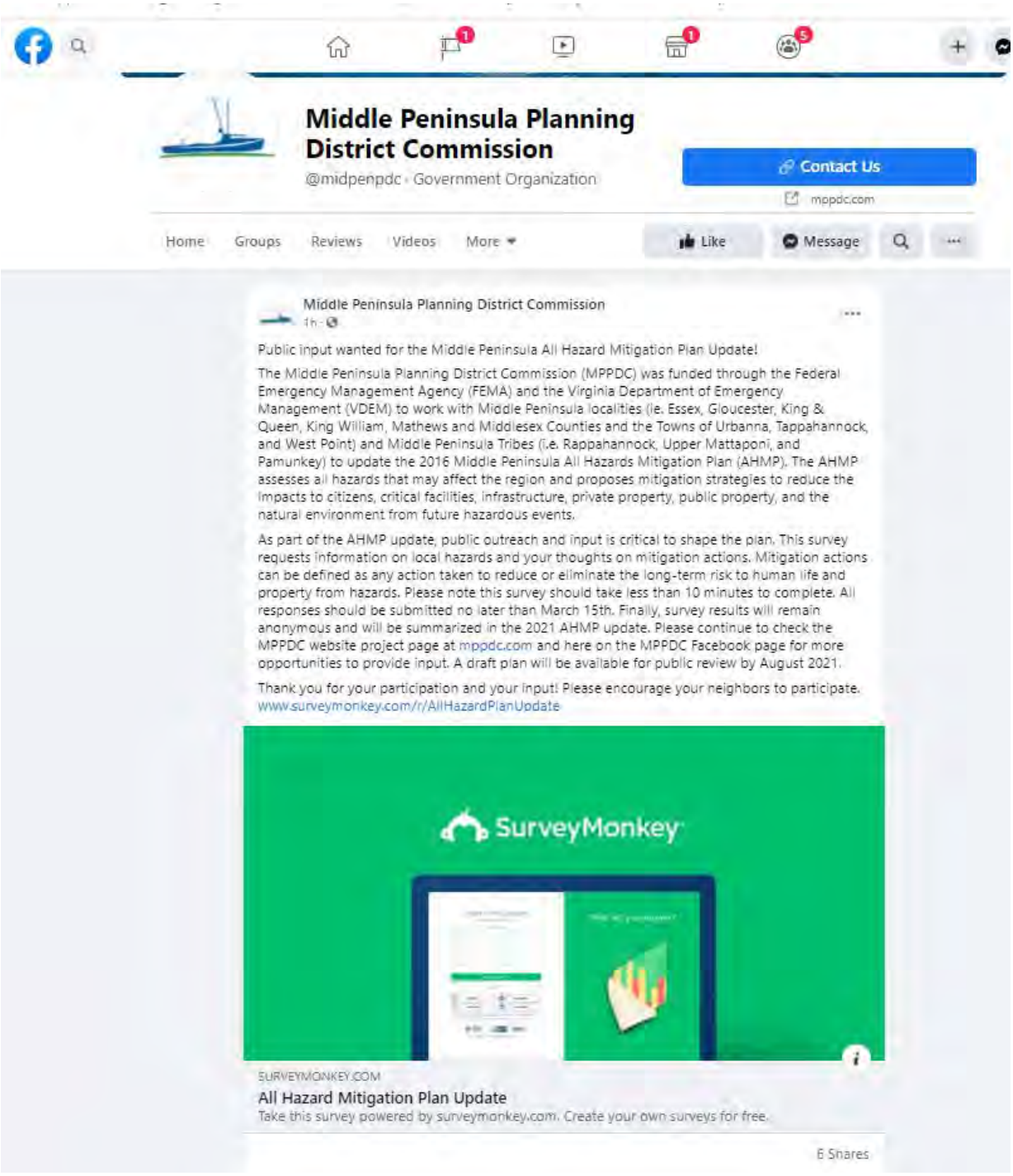
Thanks for your help,
Jackie Rickards

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION
Jackie Rickards
Senior Planning Project Manager
Middle Peninsula Planning District Commission
P.O.Box 286
Saluda,Va 23149
215-264-6451
www.mppdc.com

Invitation sent to:

- John Bateman, Northern Neck Planning District Commission
- Kate Hale, New Kent County Deputy Coordinator of Emergency Management
- Kelley LaDuc, New Kent County Planning Dirctor
- Louisa County Fire & Emergency Management
- David Nunnally, Caroline County Senior Environmental Planner
- David P. Maloney, Hanover County Planning Director
- Hope D. Mothershead, Richmond County Director of Planning & Zoning
- Darrin Lee, Westmoreland County Planner

Appendix E-
Press Releases and Facebook Statistics

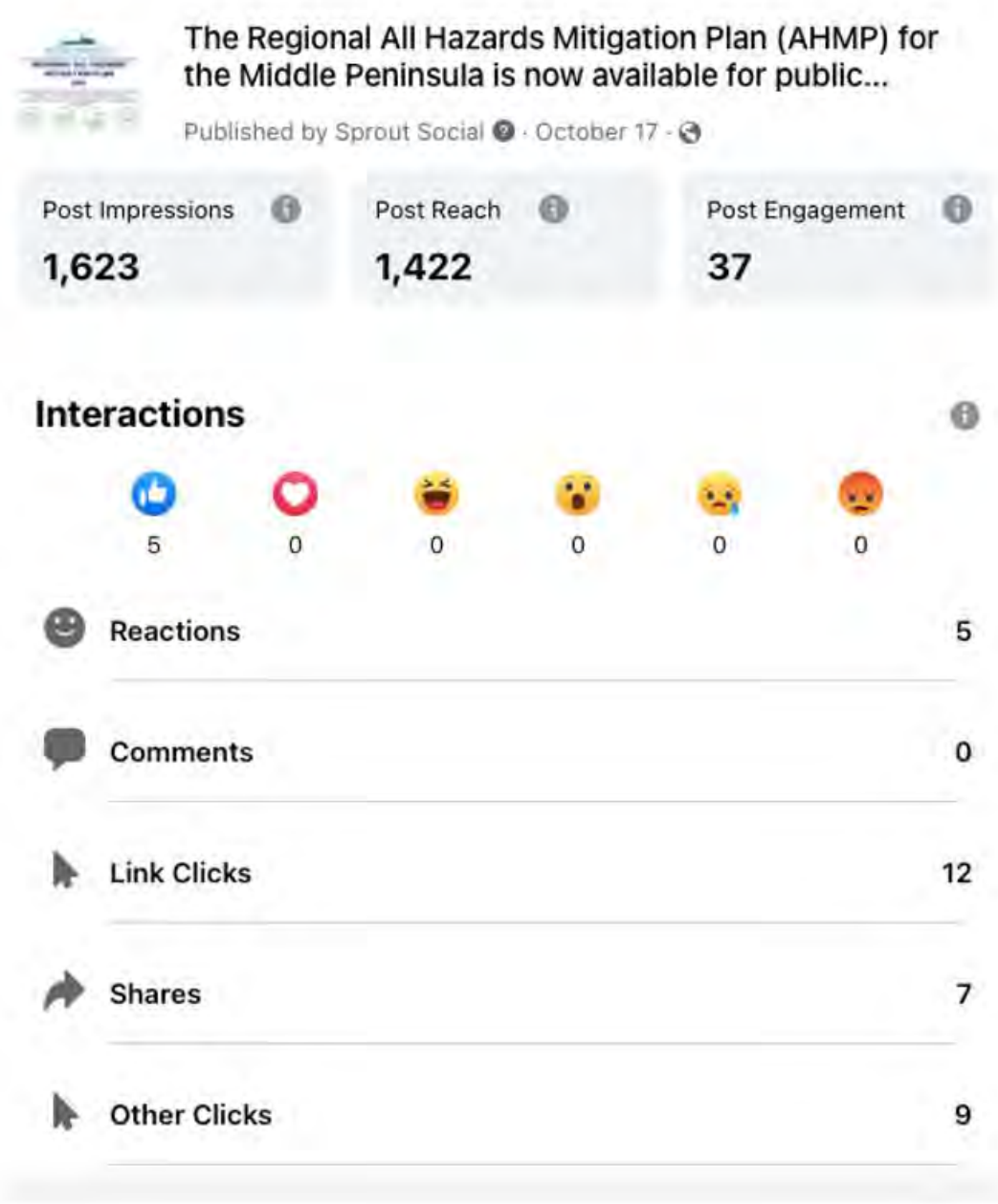

Middle Peninsula Planning District Commission
@midpenpdc · Government Organization
Contact Us
mppdc.com
Home
Groups
Reviews
Videos
More
Like
Message
Middle Peninsula Planning District Commission
1h ·
Public input wanted for the Middle Peninsula All Hazard Mitigation Plan Update!
The Middle Peninsula Planning District Commission (MPPDC) was funded through the Federal Emergency Management Agency (FEMA) and the Virginia Department of Emergency Management (VDEM) to work with Middle Peninsula localities (ie. Essex, Gloucester, King & Queen, King William, Mathews and Middlesex Counties and the Towns of Urbanna, Tappahannock, and West Point) and Middle Peninsula Tribes (i.e. Rappahannock, Upper Mattaponi, and Pamunkey) to update the 2016 Middle Peninsula All Hazards Mitigation Plan (AHMP). The AHMP assesses all hazards that may affect the region and proposes mitigation strategies to reduce the impacts to citizens, critical facilities, infrastructure, private property, public property, and the natural environment from future hazardous events.
As part of the AHMP update, public outreach and input is critical to shape the plan. This survey requests information on local hazards and your thoughts on mitigation actions. Mitigation actions can be defined as any action taken to reduce or eliminate the long-term risk to human life and property from hazards. Please note this survey should take less than 10 minutes to complete. All responses should be submitted no later than March 15th. Finally, survey results will remain anonymous and will be summarized in the 2021 AHMP update. Please continue to check the MPPDC website project page at mppdc.com and here on the MPPDC Facebook page for more opportunities to provide input. A draft plan will be available for public review by August 2021.
Thank you for your participation and your input! Please encourage your neighbors to participate.
www.surveymonkey.com/r/AllHazardPlanUpdate
SurveyMonkey
SURVEYMONKEY.COM
All Hazard Mitigation Plan Update
Take this survey powered by surveymonkey.com. Create your own surveys for free.
6 Shares

Middle Peninsula Planning District Commission
October 17 at 9:56 PM ·

The Regional All Hazards Mitigation Plan (AHMP) for the Middle Peninsula is now available for public comment through November 1, 2021. View the draft AHMP here - https://bit.ly/3ARbcV1.

Comments? Email them directly to Jackie Rickards, Senior Planning Project Manager for the Middle Peninsula Planning District Commission, at jrickards@mppdc.com.

All nine Middle Peninsula localities, including Essex, Gloucester, King and
Queen, King William, Mathews, and Middlesex Counties and the Towns of Tappahannock, Urbanna, and West Point, participated in the plan's development and amendments. In addition to the nine regional localities, the federally recognized Indian Tribes in the region participated in the 2021 AHMP update.


The Regional All Hazards Mitigation Plan (AHMP) for the Middle Peninsula is now available for public...
Published by Sprout Social · October 17 -
Post Impressions
1,623
Post Reach
1,422
Post Engagement
37
Interactions
5
0
0
0
0
0
Reactions
5
Comments
0
Link Clicks
12
Shares
7
Other Clicks
9

Appendix F -
Hazards Ranking for Each Locality and Tribe

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

ESSEX COUNTY

EVENT						UNMITIGATED	
	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	RISK	RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	2	2	2	2	**44%**	**3**
Flooding (ie. coastal, riverine, ditch & stormwater)	1	2	2	2	1	**19%**	**6**
Lightning	3	1	1	1	1	**33%**	**4**
Hurricanes	1	3	3	3	2	**31%**	**5**
Summer Storms	3	2	2	2	2	**67%**	**1**
Tornados	1	3	3	3	2	**31%**	**5**
Coastal/Shoreline Erosion	1	1	1	1	1	**11%**	**7**
Wildfire	1	1	1	1	1	**11%**	**7**
Sea Level Rise	1	1	1	1	1	**11%**	**7**
High Wind/Windstorms	1	2	2	2	1	**19%**	**6**
HAZMAT	1	1	1	1	1	**11%**	**7**
Drought	1	1	1	1	1	**11%**	**7**
Dam Failure	1	1	1	1	1	**11%**	**7**
Extreme Temperatures (Cold & Heat)	1	1	1	1	1	**11%**	**7**
Earthquake	1	1	1	1	1	**11%**	**7**
Air Quality	1	1	1	1	1	**11%**	**7**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	**11%**	**7**
Land Subsidence/Karst	1	1	1	1	1	**11%**	**7**
Communicable Diseases	2	3	3	3	2	**61%**	**2**
AVERAGE	**1.32**	**1.53**	**1.53**	**1.53**	**1.26**	**15%**	

**Threat increases with percentage.*

UNMITIGATED RISK=		PROBABILITY * IMPACT	
	0.09	**0.32**	**0.30**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

TOWN OF TAPPAHANNOCK

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	2	2	2	2	**44%**	**3**
Flooding (ie. coastal, riverine, ditch & stormwater)	1	2	2	2	1	**19%**	**6**
Lightning	3	1	1	1	1	**33%**	**4**
Hurricanes	1	3	3	3	2	**31%**	**5**
Summer Storms	3	2	2	2	2	**67%**	**1**
Tornados	1	3	3	3	2	**31%**	**5**
Coastal/Shoreline Erosion	1	1	1	1	1	**11%**	**7**
Wildfire	1	1	1	1	1	**11%**	**7**
Sea Level Rise	1	1	1	1	1	**11%**	**7**
High Wind/Windstorms	1	2	2	2	1	**19%**	**6**
HAZMAT	1	1	1	1	1	**11%**	**7**
Drought	1	1	1	1	1	**11%**	**7**
Dam Failure	1	1	1	1	1	**11%**	**7**
Extreme Temperatures (Cold & Heat)	1	1	1	1	1	**11%**	**7**
Earthquake	1	1	1	1	1	**11%**	**7**
Air Quality	1	1	1	1	1	**11%**	**7**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	**11%**	**7**
Land Subsidence/Karst	1	1	1	1	1	**11%**	**7**
Communicable Diseases	2	3	3	3	2	**61%**	**2**
AVERAGE	**1.32**	**1.53**	**1.53**	**1.53**	**1.26**	**15%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.15	**0.40**	**0.39**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

GLOUCESTER COUNTY

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	2	2	3	2	**50%**	**4**
Flooding (ie. coastal, riverine, ditch & stormwater)	3	2	3	2	2	**75%**	**2**
Lightning	3	1	2	2	1	**50%**	**4**
Hurricanes	3	3	3	3	2	**92%**	**1**
Summer Storms	3	2	2	2	2	**67%**	**3**
Tornados	2	2	2	2	2	**44%**	**5**
Coastal/Shoreline Erosion	3	1	2	1	2	**50%**	**4**
Wildfire	2	1	1	1	2	**28%**	**7**
Sea Level Rise	3	0	2	2	2	**50%**	**4**
High Wind/Windstorms	2	2	2	1	1	**33%**	**7**
HAZMAT	2	2	2	2	1	**39%**	**6**
Drought	2	0	1	2	2	**28%**	**7**
Dam Failure	1	1	1	1	2	**14%**	**9**
Extreme Temperatures (Cold & Heat)	2	2	1	1	2	**33%**	**7**
Earthquake	1	1	1	1	0	**8%**	**10**
Air Quality	1	0	0	0	0	**0%**	**12**
Shrink-Swell Soils (soils with high levels of clay)	1	0	1	0	1	**6%**	**11**
Land Subsidence/Karst	0	0	0	0	0	**0%**	**12**
Communicable Diseases	2	1	0	2	2	**28%**	**8**
AVERAGE	**2.00**	**1.21**	**1.47**	**1.47**	**1.47**	**22%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.22	**0.60**	**0.37**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

KING & QUEEN COUNTY

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	3	2	1	1	1	**42%**	**3**
Flooding (ie. coastal, riverine, ditch & stormwater)	2	2	1	1	1	**28%**	**6**
Lightning	2	2	1	1	1	**28%**	**6**
Hurricanes	2	2	2	2	1	**39%**	**4**
Summer Storms	3	2	2	1	1	**50%**	**2**
Tornados	2	2	2	1	1	**33%**	**5**
Coastal/Shoreline Erosion	1	1	1	1	1	**11%**	**8**
Wildfire	3	2	2	1	1	**50%**	**2**
Sea Level Rise	1	1	1	1	1	**11%**	**8**
High Wind/Windstorms	2	1	1	1	1	**22%**	**7**
HAZMAT	2	2	2	2	1	**39%**	**4**
Drought	3	1	1	1	1	**33%**	**5**
Dam Failure	2	1	1	1	1	**22%**	**7**
Extreme Temperatures (Cold & Heat)	2	2	1	1	1	**28%**	**6**
Earthquake	1	1	1	1	1	**11%**	**8**
Air Quality	1	1	1	1	1	**11%**	**8**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	**11%**	**8**
Land Subsidence/Karst	0	0	0	0	0	**0%**	**9**
Communicable Diseases	3	3	3	3	2	**92%**	**1**
AVERAGE	**1.89**	**1.53**	**1.32**	**1.16**	**1.00**	**19%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.19	**0.57**	**0.33**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

KING WILLIAM COUNTY

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	1	1	2	1	**28%**	**3**
Flooding (ie. coastal, riverine, ditch & stormwater)	2	1	1	1	1	**22%**	**4**
Lightning	2	1	1	1	1	**22%**	**4**
Hurricanes	2	2	2	2	2	**44%**	**1**
Summer Storms	2	1	1	1	1	**22%**	**4**
Tornados	2	2	2	2	2	**44%**	**1**
Coastal/Shoreline Erosion	1	1	1	0	1	**8%**	**6**
Wildfire	1	1	1	0	1	**8%**	**6**
Sea Level Rise	1	1	1	0	1	**8%**	**6**
High Wind/Windstorms	1	1	1	1	1	**11%**	**5**
HAZMAT	1	1	1	0	1	**8%**	**6**
Drought	1	0	1	0	1	**6%**	**7**
Dam Failure	1	1	1	0	1	**8%**	**6**
Extreme Temperatures (Cold & Heat)	1	1	0	1	1	**8%**	**6**
Earthquake	1	1	1	1	1	**11%**	**5**
Air Quality	0	0	0	0	0	**0%**	**8**
Shrink-Swell Soils (soils with high levels of clay)	1	0	0	0	0	**0%**	**8**
Land Subsidence/Karst	0	0	0	0	0	**0%**	**8**
Communicable Diseases	1	1	0	0	1	**6%**	**7**
AVERAGE	**1.21**	**0.89**	**0.84**	**0.63**	**0.95**	**8%**	

**Threat increases with percentage.*

UNMITIGATED RISK=		PROBABILITY * IMPACT	
	0.08	**0.37**	**0.22**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

TOWN OF WEST POINT

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	1	1	1	1	**22%**	4
Flooding (ie. coastal, riverine, ditch & stormwater)	3	1	2	1	1	**42%**	1
Lightning	1	1	1	1	1	**11%**	7
Hurricanes	1	2	2	2	2	**22%**	4
Summer Storms	2	1	2	1	2	**33%**	3
Tornados	2	1	2	2	1	**33%**	3
Coastal/Shoreline Erosion	2	1	2	2	2	**39%**	2
Wildfire	1	1	1	1	1	**11%**	7
Sea Level Rise	1	1	2	2	1	**17%**	5
High Wind/Windstorms	2	1	2	1	2	**33%**	3
HAZMAT	1	2	1	1	1	**14%**	6
Drought	1	1	0	1	1	**8%**	8
Dam Failure	0	0	0	0	0	**0%**	
Extreme Temperatures (Cold & Heat)	1	2	1	1	1	**14%**	6
Earthquake	1	1	1	1	1	**11%**	7
Air Quality	1	1	1	1	1	**11%**	7
Shrink-Swell Soils (soils with high levels of clay)	3	1	2	1	1	**42%**	1
Land Subsidence/Karst	1	1	1	1	1	**11%**	7
Communicable Diseases	2	2	1	2	2	**39%**	2
AVERAGE	**1.47**	**1.16**	**1.32**	**1.21**	**1.21**	**14%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.14	**0.44**	**0.32**

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Revised: 2/25/2010

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

MATHEWS COUNTY

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	3	1	2	3	1	**58%**	**1**
Flooding (ie. coastal, riverine, ditch & stormwater)	3	1	2	2	1	**50%**	**2**
Lightning	3	1	1	1	1	**33%**	**5**
Hurricanes	2	2	2	2	2	**44%**	**3**
Summer Storms	3	1	1	1	1	**33%**	**5**
Tornados	1	1	2	1	1	**14%**	**8**
Coastal/Shoreline Erosion	3	1	1	1	1	**33%**	**5**
Wildfire	1	1	1	1	1	**11%**	**9**
Sea Level Rise	2	1	1	1	1	**22%**	**7**
High Wind/Windstorms	2	1	1	1	2	**0%**	**10**
HAZMAT	1	1	1	1	1	**0%**	**10**
Drought	2	1	1	1	2	**28%**	**6**
Dam Failure	0	0	0	0	0	**0%**	
Extreme Temperatures (Cold & Heat)	3	1	1	1	2	**42%**	**4**
Earthquake	1	1	1	1	1	**0%**	**10**
Air Quality	1	1	1	1	1	**11%**	**9**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	**11%**	**9**
Land Subsidence/Karst	1	1	1	1	1	**11%**	**9**
Communicable Diseases	2	2	1	2	1	**33%**	**5**
AVERAGE	**1.84**	**1.05**	**1.16**	**1.21**	**1.16**	**17%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.17	**0.56**	**0.30**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

MIDDLESEX COUNTY

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	3	2	3	2	2	**75%**	**1**
Flooding (ie. coastal, riverine, ditch & stormwater)	3	2	3	1	2	**67%**	**2**
Lightning	2	2	2	1	2	**39%**	**6**
Hurricanes	2	2	3	2	2	**50%**	**4**
Summer Storms	3	2	3	1	2	**67%**	**2**
Tornados	3	2	2	1	2	**58%**	**3**
Coastal/Shoreline Erosion	3	0	2	1	2	**42%**	**5**
Wildfire	2	1	2	1	2	**33%**	**7**
Sea Level Rise	1	0	1	1	2	**11%**	**9**
High Wind/Windstorms	2	2	2	1	2	**39%**	**6**
HAZMAT	2	2	2	1	1	**33%**	**7**
Drought	2	0	1	1	1	**17%**	**8**
Dam Failure	1	1	1	0	2	**11%**	**9**
Extreme Temperatures (Cold & Heat)	2	2	1	1	2	**33%**	**7**
Earthquake	1	1	1	1	1	**11%**	**9**
Air Quality	1	1	1	1	1	**11%**	**9**
Shrink-Swell Soils (soils with high levels of clay)	2	0	1	0	2	**17%**	**8**
Land Subsidence/Karst	2	1	1	0	1	**17%**	**8**
Communicable Diseases	2	3	0	3	1	**39%**	**6**
AVERAGE	**2.05**	**1.37**	**1.68**	**1.05**	**1.68**	**24%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.24	**0.62**	**0.38**

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MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

TOWN OF URBANNA

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	2	3	2	2	**50%**	**4**
Flooding (ie. coastal, riverine, ditch & stormwater)	2	2	2	2	2	**44%**	**5**
Lightning	3	2	2	2	2	**67%**	**2**
Hurricanes	2	3	2	3	2	**56%**	**3**
Summer Storms	3	3	2	2	1	**67%**	**2**
Tornados	2	2	2	2	2	**44%**	**5**
Coastal/Shoreline Erosion	2	2	2	2	2	**44%**	**5**
Wildfire	2	2	2	1	2	**39%**	**6**
Sea Level Rise	2	1	2	1	2	**33%**	**7**
High Wind/Windstorms	2	2	2	2	2	**44%**	**5**
HAZMAT	2	2	2	1	1	**33%**	**7**
Drought	2	1	1	1	1	**22%**	**8**
Dam Failure	0	0	0	0	1	**0%**	**10**
Extreme Temperatures (Cold & Heat)	1	1	1	1	1	**11%**	**9**
Earthquake	1	1	1	1	1	**11%**	**9**
Air Quality	1	1	1	1	1	**11%**	**9**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	1	**11%**	**9**
Land Subsidence/Karst	1	0	0	0	0	**0%**	**10**
Communicable Diseases	3	2	2	3	2	**75%**	**1**
AVERAGE	**1.79**	**1.58**	**1.58**	**1.47**	**1.47**	**21%**	

**Threat increases with percentage.*

UNMITIGATED RISK=		PROBABILITY * IMPACT	
	0.21	**0.49**	**0.42**

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Spreadsheet developed by:

Modifications by:

Revised: 2/25/2010

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

PAMUNKEY TRIBE

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	2	1	1	0	1	**17%**	3
Flooding (ie. coastal, riverine, ditch & stormwater)	3	1	2	0	1	**33%**	1
Lightning	1	1	1	0	1	**8%**	4
Hurricanes	2	1	2	0	1	**22%**	2
Summer Storms	2	1	1	0	1	**17%**	3
Tornados	1	1	1	0	1	**8%**	4
Coastal/Shoreline Erosion	3	1	2	0	1	**33%**	7
Wildfire	1	1	1	0	1	**8%**	4
Sea Level Rise	2	1	2	0	1	**22%**	2
High Wind/Windstorms	2	1	2	0	1	**22%**	2
HAZMAT	1	1	1	0	1	**8%**	4
Drought	1	1	1	0	1	**8%**	4
Dam Failure	0	0	0	0	1	**0%**	5
Extreme Temperatures (Cold & Heat)	1	1	1	0	1	**8%**	4
Earthquake	1	1	1	0	1	**8%**	4
Air Quality	1	1	1	0	1	**8%**	4
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	0	1	**8%**	4
Land Subsidence/Karst	2	1	1	0	1	**17%**	3
Communicable Diseases	1	1	1	0	1	**8%**	4
AVERAGE	**1.47**	**0.95**	**1.21**	**0.00**	**1.00**	**9%**	

**Threat increases with percentage.*

UNMITIGATED RISK=		PROBABILITY * IMPACT	
	0.09	**0.44**	**0.21**

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Revised: 2/25/2010

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS -- SUMMARY SHEET

RAPPAHANNOCK TRIBE

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*COOP and Interruption of services*	*Pre-Planning*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	3	2	2	3	1	**67%**	1
Flooding (ie. coastal, riverine, ditch & stormwater)	3	2	2	2	2	**67%**	2
Lightning	3	2	2	2	1	**58%**	4
Hurricanes	2	3	3	3	2	**61%**	3
Summer Storms	3	2	2	2	1	**58%**	4
Tornados	2	2	3	2	1	**44%**	6
Coastal/Shoreline Erosion	2	2	2	1	2	**39%**	7
Wildfire	2	2	2	1	2	**39%**	7
Sea Level Rise	1	1	2	1	2	**17%**	9
High Wind/Windstorms	3	2	3	3	2	**83%**	1
HAZMAT	2	3	1	2	2	**44%**	6
Drought	1	1	1	1	2	**14%**	10
Dam Failure	0	0	0	0	0	**0%**	13
Extreme Temperatures (Cold & Heat)	2	2	1	1	1	**28%**	8
Earthquake	1	1	1	1	1	**11%**	11
Air Quality	1	2	1	1	1	**14%**	10
Shrink-Swell Soils (soils with high levels of clay)	1	0	1	1	1	**8%**	12
Land Subsidence/Karst	1	0	0	0	0	**0%**	13
Communicable Diseases	2	3	1	3	2	**50%**	5
AVERAGE	**1.84**	**1.68**	**1.58**	**1.58**	**1.37**	**23%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.23	**0.56**	**0.41**

Spreadsheet developed by: KAISER PERMANENTE®

Modifications by:

Revised: 2/25/2010

MIDDLE PENINSULA HAZARD AND VULNERABILITY ASSESSMENT TOOL
NATURAL HAZARDS

UPPER MATTAPONI INDIAN TRIBE

EVENT	PROBABILITY	HUMAN IMPACT	PROPERTY AND FACILITY IMPACT	BUSINESS IMPACT	Mitigation Options	UNMITIGATED RISK	UNMITIGATED RANKING
	Likelihood this will occur	*Possibility of death or injury to public and responders*	*Physical losses and damages*	*Interruption of services*	*Preparedness, resources and ability to mitigate,*	*Relative Threat*	*Based only on probability and threat*
SCORE	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 = N/A 1 = Low 2 = Moderate 3 = High**	**0 - 100%**	
Winter Storms (Ice & Snow)	3	2	2	2	2	**67%**	**3**
Flooding (ie. coastal, riverine, ditch & stormwater)	3	2	3	1	3	**75%**	**1**
Lightning	3	1	1	1	3	**50%**	**8**
Hurricanes	3	2	2	2	2	**67%**	**2**
Summer Storms	3	2	2	1	2	**58%**	**4**
Tornados	2	2	3	2	3	**56%**	**5**
Coastal/Shoreline Erosion	2	1	2	1	3	**39%**	**10**
Wildfire	2	1	1	1	2	**28%**	**15**
Sea Level Rise	2	1	2	1	2	**33%**	**14**
High Wind/Windstorms	3	1	1	1	3	**50%**	**6**
HAZMAT	1	1	1	1	3	**17%**	**11**
Drought	2	1	1	1	3	**33%**	**13**
Dam Failure	2	1	2	1	3	**39%**	**12**
Extreme Temperatures (Cold & Heat)	3	2	1	1	2	**50%**	**7**
Earthquake	1	1	2	1	3	**19%**	**16**
Air Quality	1	1	1	1	3	**17%**	**17**
Shrink-Swell Soils (soils with high levels of clay)	1	1	1	1	3	**17%**	**18**
Land Subsidence/Karst	1	1	1	1	3	**17%**	**19**
Communicable Diseases	2	2	1	2	2	**39%**	**9**
AVERAGE	**1.60**	**1.04**	**1.20**	**0.92**	**2.00**	**28%**	

**Threat increases with percentage.*

UNMITIGATED RISK=	PROBABILITY * IMPACT		
	0.28	**0.63**	**0.45**

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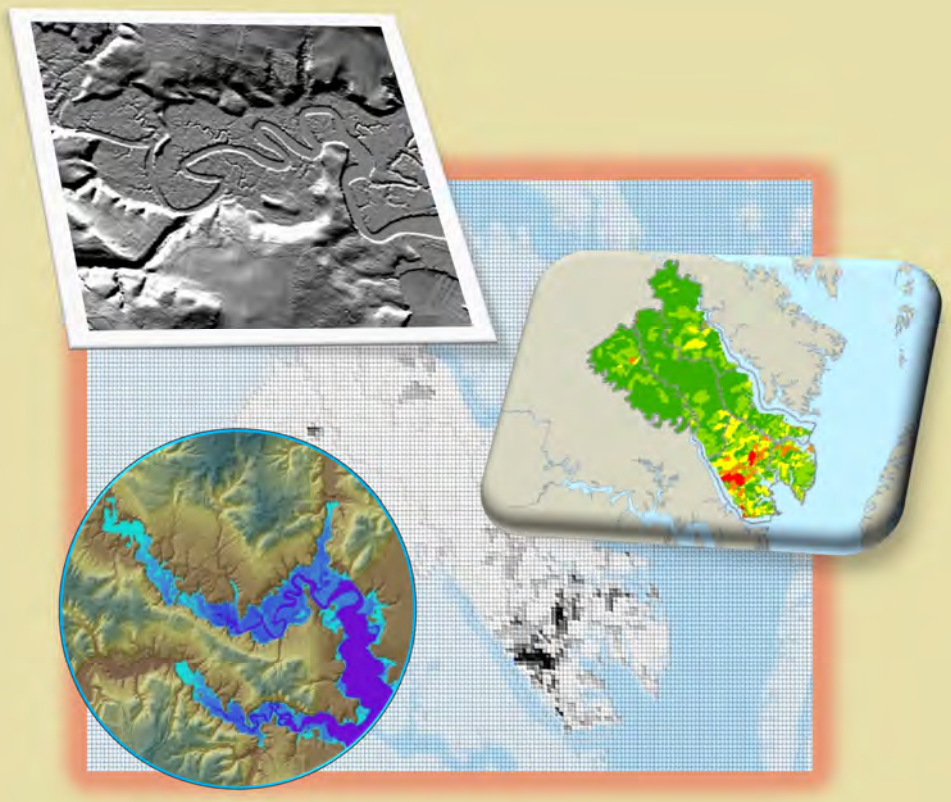
Appendix G –
HAZUS Methodology

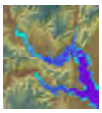
Middle Peninsula Planning District Commission
2015 Hazard Mitigation Plan Update

HAZUS Modeling Report



Dewberry

April 2015



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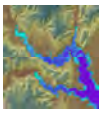


INTRODUCTION

As part of the Middle Peninsula Planning District Project, Dewberry was asked to perform HAZUS flood and hurricane wind modeling for the next Hazard Mitigation Plan (HMP) revision. The goal and intent of the effort is that Dewberry would provide the MPPDC updated Hazard Identification and Risk Assessment (HIRA) elements that can be incorporated into the final MPPDC HMP. The effort is also a repeat effort in that Dewberry had provided the same services for the currently approved HMP.

Therefore, the work performed seeks to update the previous HIRA section maps, text and tables. Given the nature of hazard mitigation planning and the goals that the Federal Emergency Management Agency (FEMA) has set for jurisdictions to continually improve HMP's from one revision to the next, Dewberry has significantly improved the nature of the Hazus Flood modeling on behalf of the MPPDC. This report documents the various modeling efforts performed and, where appropriate, denotes modeling efforts that transcend previous efforts given available scope, schedule and budget of the project.

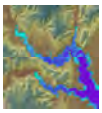
This report documents the methodology used to construct the HAZUS modeling efforts and also discusses core model results where applicable. Users of this document are directed to the final HMP that will be completed in the future (2015/2016) by the MPPDC but will include this work effort by Dewberry in the HIRA sections for Hurricane Wind and Flooding to include certain Sea Level Rise scenarios.

Flood Modeling – Riverine Streams

The previous Plan flood modeling utilized Hazus Version 1 – Maintenance Release 4; a.k.a. MR4. Significant changes have occurred with the Hazus software and models over the past five (5) years and the software has moved through the following versions:

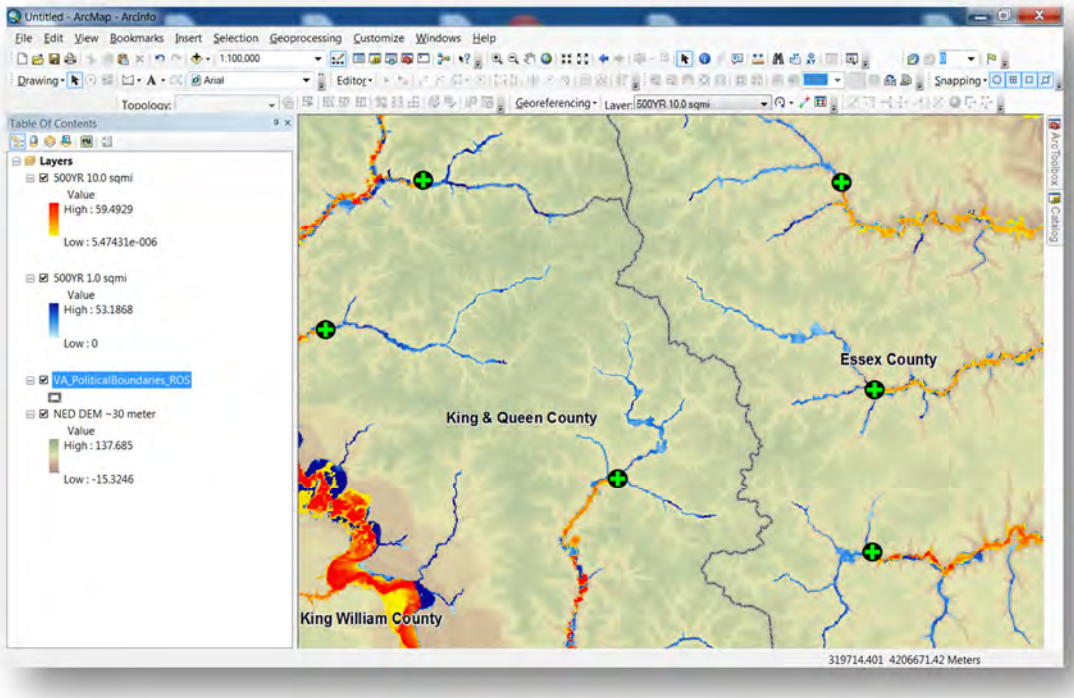
- Version 1 – Maintenance Release 4 (MR4)
- Version 1 – Maintenance Release 5 (MR5)
- Version 2.0
- Version 2.1
- Version 2.2 (current)

In addition to the version releases noted above there have also been various patches deployed in-between the version releases. One notable improvement to the Flood - Riverine Module is the automated methodology of cross section placement which, along with typical advancements in computing hardware and software, helps in the ability to process smaller drainage thresholds. Dewberry in-fact processed the project area at the one-square mile (1 mi^2) as had been suggested in the previous Plan as a mitigation action that could improve the Hazus Flood modeling efforts. This new Riverine analysis included use of the most recent National Elevation Dataset (NED) digital elevation



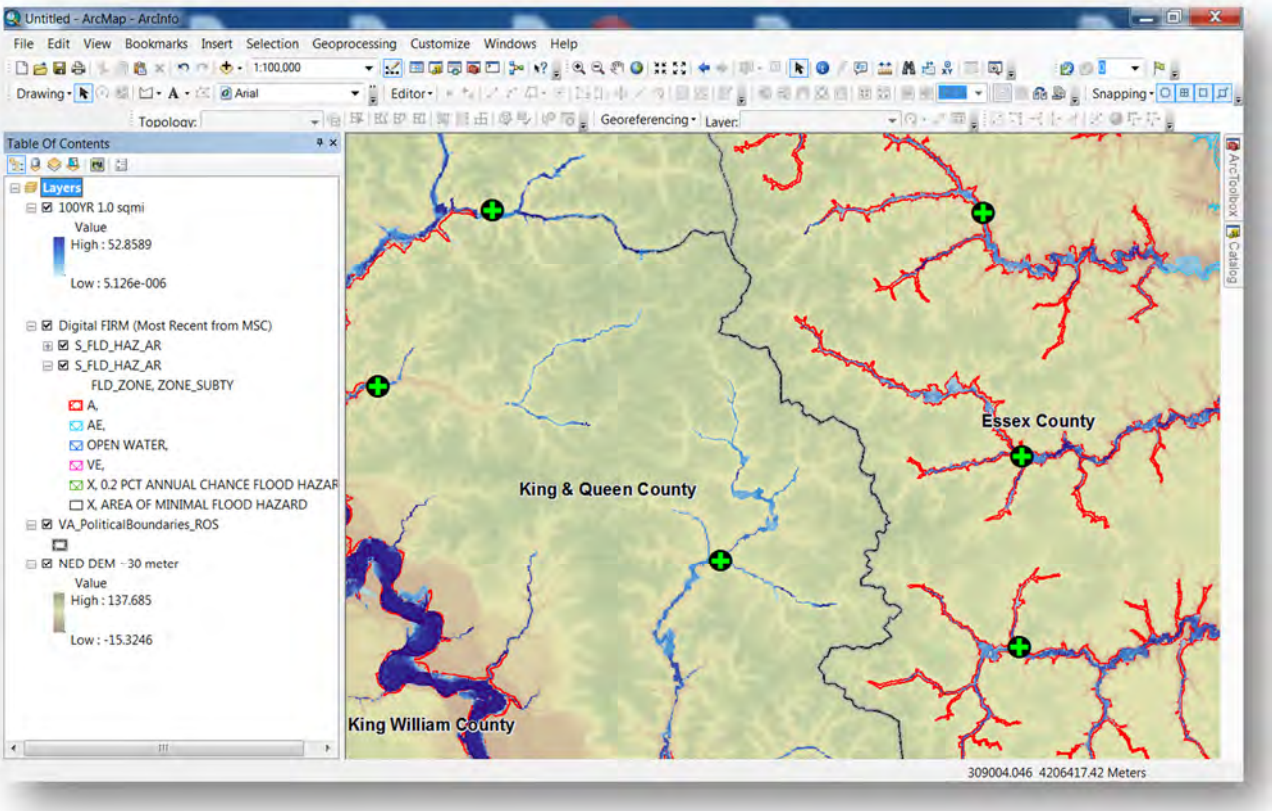
model (DEM) at the one-arc second resolution (i.e., ~ 30 meter resolution). The previous Plan Riverine modeling effort only included one-square mile (1 mi^2) delineation for Mathews County and the remainder of the Planning District utilized ten-square mile (10 mi^2). The beneficial effect of using the smaller drainage area threshold means that the analysis of flooded streams will extend further upstream - offering a more complete representation of potential flooding as is shown in **Figure 1** below. It can be seen that the blue-scale depth grid delineations of the 0.2% Annual Chance or 500-year event at one-square mile (1 mi^2) extends much further upstream as compared to the red-yellow scale grid of the same event delineated at ten-square miles (10 mi^2). The point-marker has been added to show the relative most upstream extent of the ten-square mile (10 mi^2) delineation.

Figure 1: Riverine 0.2% Annual Chance (500 Year) Depth Grids Comparison



Furthermore, the (1 mi^2) delineations, for most riverine streams are consistent with the current effective or new revised preliminary FEMA floodplain mapping. **Figure 2** shows the same example area with the FEMA digital Flood Insurance Rate Map (FIRM) data overlaid with the blue-scale depth grid delineations of the 1% Annual Chance (i.e., 100-Year Event) of the one-square mile (1 mi^2) depth grid. The example area shown includes primarily 1% Annual Chance Approximate Zone (i.e., Zone A) delineations and are shown as red outlined areas. The marker symbols have been left for reference.

Figure 2: Riverine 1% Annual Chance Depth Grid vs. FEMA Digital FIRM Comparison

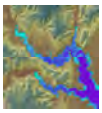


It is also important to note that most FEMA-initiated flood insurance studies use a one-square mile (1 mi^2) drainage threshold for delineation of floodplains. However, users should be warned and realize that FEMA flood studies also require the use of ground data that is much more precise than one-arc second resolution (i.e., ~ 30 meter resolution); i.e., typical FEMA studies require DEM resolution of two-meter (2 m. or ~6.6 ft.) resolution or better.

Issues & Challenges Encountered:

As noted earlier, the previous Plan riverine modeling only utilized one-square mile (1 mi^2) drainage threshold for Mathews. While the most recent effort now has accomplished one-square mile (1 mi^2) drainage threshold for the remainder of the MPPDC planning area, there were still a few issues and challenges that existed; some were overcome and others may warrant additional consideration in the future.

- **Issue 1**:
    - Issue: Hydrology or Hydraulics would not complete for a given County.



  - Solution: Divide the County into smaller sub-geographies to reduce the number of stream segments that Hazus must process. There were three (3) counties that had to be divided into two (2) portions each - Essex, King and Queen and lastly, King William each had to be divided into portions. Dividing these counties into smaller portions enabled Hazus to process a smaller quantity of streams and produce usable results.

- **Issue 2**:
  - Issue: Hazus produced "Failed Reaches" or "Problem Reaches".
  - Solution: Utilize successful reaches (i.e., non-failed) from adjacent geography where it exists. For example, Dragon Swamp which borders both Essex and King and Queen Counties failed in the riverine model portion of Essex County yet, the same reach did not fail in the companion model of King and Queen. In order to overcome such issues all grids were merged across the MPPDC area to compensate for the deficiency of failed reaches. Inevitably, the Hazus software will utilize the damages estimated from the flooding source that generates the greatest amount of estimated damage. Therefore, another consideration regarding failed reaches is the interaction within Hazus between riverine and coastal hazards as defined by the depth grids from each flooding source. There are failed reaches for which the riverine module did not create a depth grid, however in-reality the same reach may actually be influenced by coastal forces and therefore the coastal methodology is able to supplement or compensate for the lack of a riverine depth grid. An example (see **Figure 3** – next page) where the coastal module generated depth for a riverine failed reach includes Hoskins Creek which runs through the Town of Tappahannock or nearby Piscataway Creek and its tributaries - Mussel Creek or Mill Creek. Also, Cohoke Mill Pond in King William County presents another example of same.

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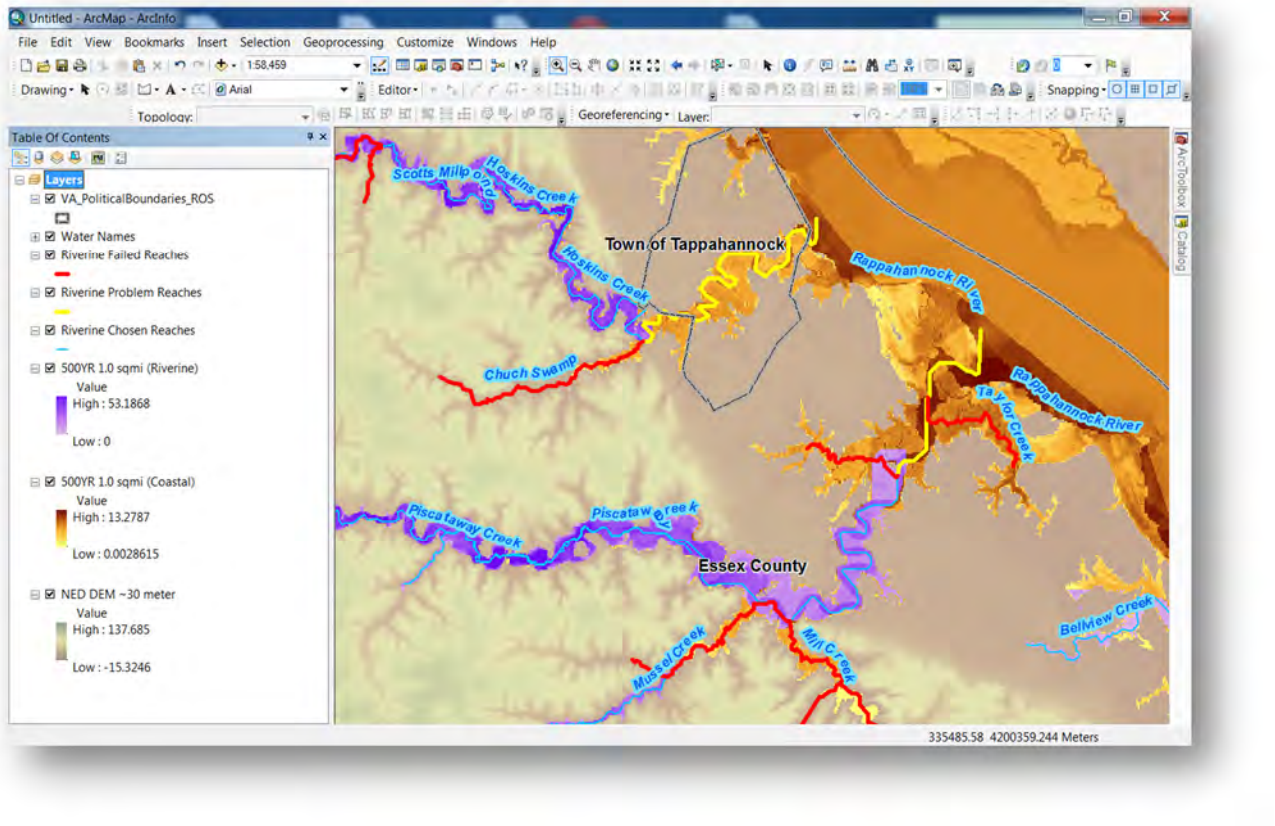
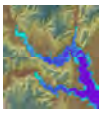
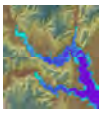
Figure 3: Riverine Failed/Problem Reaches and Riverine Depth Grid vs. Coastal Depth Grid



- Other Discussion: Regarding failed reaches, the Hazus documentation has little information that explains the reasons why reaches fail. However, Dewberry experience has shown that reaches fail for a few common reasons that are not always in the user's control; for example given a particular geography a reach may fail due to lack of hydrologic stream gauges within the vicinity. Another possibility is that the hydrologic methodology employed by Hazus does not produce any flow (i.e., discharge or "Q" modeling parameter); this is most common where rural regression equations are employed. Notably, it is also possible that Hazus has not been updated with the most recent regression equation parameters available from the United States Geologic Survey (USGS). While Dewberry did not verify the equation parameters in Hazus Version 2.2, based on other work that Dewberry has performed in Virginia, it was known that Hazus Version 2.1 did not include the most recent rural regression equations available from the USGS.



- **Issue 3**:
  - Issue: FEMA Region III concern over the use of Hazus Level 1 functionality.
  - Solution: The solution employed included the suggestion that the MPPDC and Dewberry discuss with FEMA Region III expectations of the Hazus modeling. The call that was held on March 13, 2015 included such discussions. Ultimately, the MPPDC and the Virginia Department of Emergency Management (VADEM) agreed that the Dewberry plan of action was reasonable and appropriate. However, for reference, Dewberry has compiled an explanation of the specific concerns expressed by the Region during the March 13, 2015 call. Dewberry agrees with the Region in that the best data is in-fact the best, however needs to be tempered with the realities of effort, time and cost. The Region expressed concern over the use of the Level 1 methodology which means the Region would prefer the use of the following:
    - Hydrology & Hydraulics (H&H) – preference would be to use data typical of FEMA Risk MAP Flood Insurance Studies (FIS) and Non-Regulatory Depth Grid creation versus the Hazus methodology. Typical H&H is accessed via models such as US Army Corps of Engineers HEC-RAS models. Where such models are not available or inaccessible, digital FIRM data may be used but legacy riverine data typically only includes water surface elevations for the 1% annual chance event which is not conducive to generating annualized loss values expected of hazard mitigation planning. Last, where models and digital FIRM data are not complete or not available, the remaining H&H data would typically be gleaned from Flood Insurance Study (FIS) reports; more specifically, users wishing to develop the flood hazard into depth grids for direct-use in Hazus, would have to convert water surface profiles within the FIS-text into digital data. Lastly, regardless of which H&H inputs mentioned are available, the user would be required to process all data to digital water surfaces for further processing into depth grids.
    - Topographic Data – preference is to use LiDAR-based topography at a resolution consistent with FEMA Risk MAP Flood Insurance Studies (FIS) and Non-Regulatory Depth Grid creation versus the one-arc second or ~ 30-meter DEM employed.
    - Depth Grid Creation – preference is again suggested to develop depth grids consistent with FEMA Risk MAP Non-Regulatory Depth Grid creation which means the use of hydraulic stream models (if they exist and are accessible), and/or the use of digital FIRM data, and/or the use of flood profiles published in FIS reports. Notably, while there is definitely benefits associated with the most accurate inputs, Dewberry noted on the call that the level of effort to produce such depth grids is quite extensive and typically is not feasible under budgets available for HMP's.



Flood Modeling – Coastal

As with the Flood Riverine, the previous Plan flood modeling utilized Hazus Version 1 – Maintenance Release 4; a.k.a. MR4. The coastal flood module has also experienced certain changes; the primary difference in the coastal model is that users no longer define certain shoreline characteristics such as wave exposure (i.e., Open Coast, Moderate/Minimal Exposure or Sheltered) and shoreline type (e.g., Rocky bluffs, sandy beaches w/ small dunes, open wetlands, etc.). Otherwise, much of the coastal module is the same in that users are still asked to choose shoreline segments and then users have the option of sub-dividing the shorelines and entering water surface and wave characteristics.

Dewberry followed user guidance for the entry of water surfaces by obtaining the most recent versions of either effective (or) newly released preliminary FIS-text from the FEMA Map Service Center (MSC). Dewberry obtained the following FEMA FIS documents:

- ESSEX COUNTY,VIRGINIA AND INCORPORATED AREAS – Revised May 4, 2015
    - FLOOD INSURANCE STUDY NUMBER - 51057CV000B
- GLOUCESTER COUNTY,VIRGINIA (ALL JURISDICTIONS) – Revised November 19, 2014
    - FLOOD INSURANCE STUDY NUMBER - 51073CV000B
- KING AND QUEEN COUNTY,VIRGINIA AND INCORPORATED AREAS – Preliminary October 3, 2013
    - FLOOD INSURANCE STUDY NUMBER - 51097CV000B
- KING WILLIAM COUNTY,VIRGINIA AND INCORPORATED AREAS – Preliminary October 3, 2013
    - FLOOD INSURANCE STUDY NUMBER - 51101CV000B
- MIDDLESEX COUNTY,VIRGINIA AND INCORPORATED AREAS – Revised May 18, 2015
    - FLOOD INSURANCE STUDY NUMBER - 51119CV000B
- MATHEWS COUNTY,VIRGINIA (ALL JURISDICTIONS) – Revised December 9, 2014
    - FLOOD INSURANCE STUDY NUMBER - 51115CV000B

Per Hazus User guidance the shoreline was divided as closely as possible to the Transect Location Map found within each respective FIS and the Starting Stillwater Elevations (typ. TABLE 2 – Transect Data) were utilized to populate the Hazus menu of Stillwater elevations. Therefore, the Hazus Level 1 methodology was utilized to perform hydrology, hydraulics and coastal hazard delineation. The resulting depth grids were created from the same NED one-arc second DEM utilized for the Riverine analysis.

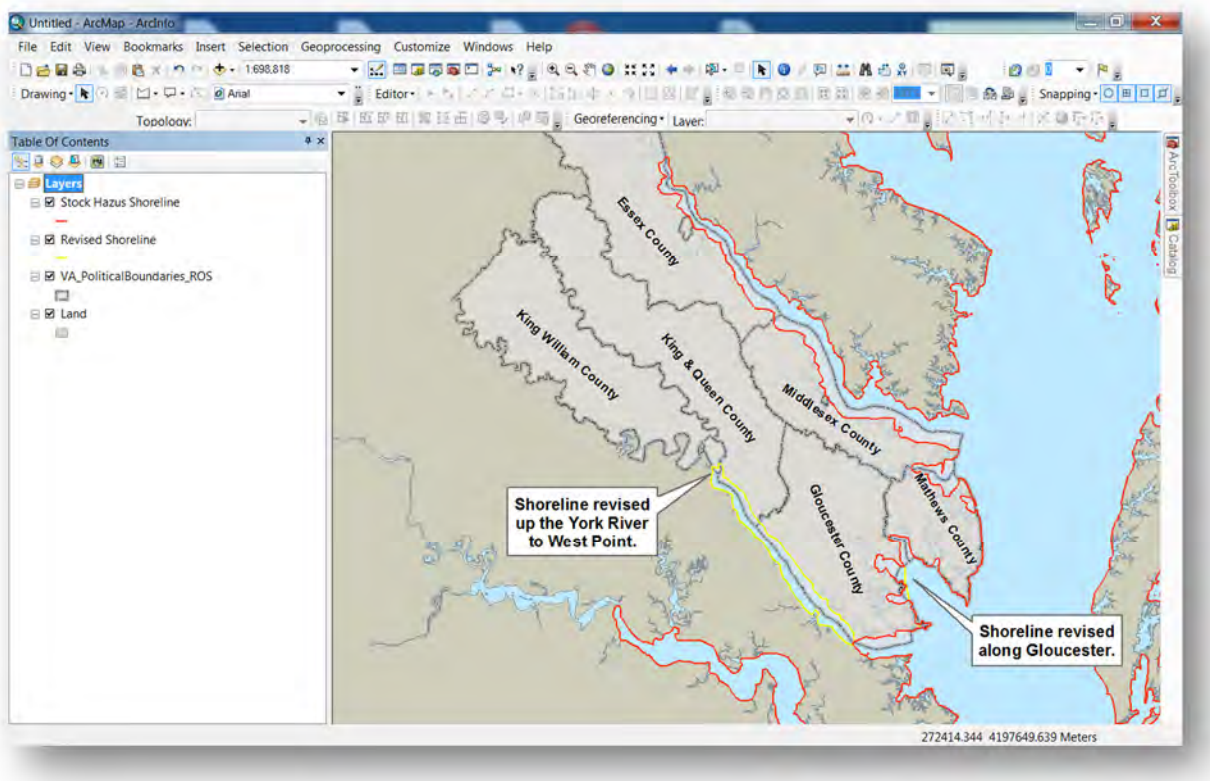
Issues & Challenges Encountered:

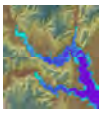
The coastal modeling performed for the previous Plan utilized the Hazus Level 1 methodology. The original intent for the current Plan update was to utilize the same depth grids as the previous Plan, however because new FEMA FIS have been released for all of the counties in the MPPDC region, it was determined that the previous analysis depth grids would not be valid to re-run through the new version

of Hazus (Version 2.2) because of the new FEMA coastal studies. There were a few issues and challenges that existed; some were overcome and others may warrant additional consideration in the future.

- **Issue 1**:
  - Issue: Hazus stock Shoreline file does not adequately intersect King and Queen nor King William Counties.
  - Solution: Dewberry made specific adjustments to the stock Hazus shoreline file in order to match, to the greatest extent possible, the most recent Flood Insurance Studies (FIS) performed along coastal Virginia and within the MPPDC region. Most importantly, all six (6) of the MPPDC counties now have coastal hazards as of the most recent FEMA Flood Studies. However, this differs from that which is in Hazus; the stock Hazus shoreline data does not intersect two (2) of six (6) counties (King William and King and Queen) and only covers a portion of Gloucester County. Inherently, if a user creates a Hazus Flood Project for any county that does not intersect with the shoreline, the user cannot define the Hazus project as having a coastal hazard. **Figure 4** shows the original stock Hazus shoreline and the edited shoreline used to extend the coastal potential up the York River along Gloucester, King and Queen, and King William Counties.

Figure 4: Hazus Shoreline Revisions





- **Issue 2**:
  - Issue: Unable to produce Coastal results for Gloucester County.
  - Solution: Simplifying the coastal shoreline was required to produce results.
  - Other Discussion: Dewberry made no less than five (5) separate attempts to produce coastal analyses for Gloucester County. In short, the coastal module would fail at the process of performing Hydrology. Based on similar experiences with other counties, it was determined that the Hazus shoreline could not be sub-divided to match the same transect divisions as documented in the FEMA FIS; the detail is too great for the simplified functionality of Hazus. The solution employed to produce results included simplifying the shoreline as also noted in **Figure 4**. The simplified shoreline enabled Hazus to no longer "stall" or "fail" at the Hydrology process. Other counties had to be re-run by simplifying the shoreline sub-divisions (see **Issue 3** below) however, the shoreline line work was not revised for other counties (except up the York River).
- **Issue 3**:
  - Issue: Unable to produce Coastal results for other counties.
  - Solution: Simplifying the manner in which the coastal shoreline is sub-divided enabled Hazus to no longer "stall" or "fail" at the processes for Hydrology.
  - Other Discussion: Dewberry made multiple attempts (as necessary) to produce coastal analyses results for each of the MPPDC counties. However, the coastal module would fail at the process of performing Hydrology ***if and when*** the shoreline sub-divisions were too detailed for Hazus to process. As noted earlier, in some cases the Hazus shoreline could not be sub-divided to match the same transect divisions as documented in the FEMA FIS because the detail is too great for the simplified functionality of Hazus. **Figure 5** (below) includes King and Queen County and shows an example where the Hazus shoreline was able to be sub-divided *almost exactly* to match the FIS; the colored shoreline segments are those defined for the coastal run in Hazus and are overlaid on a geo-referenced image of the FIS Transect Map. **Figure 6** is a zoom-in view showing the slight differences between the detailed shoreline of King and Queen; the importance is to note how the FIS Transect #9 is positioned upstream in the Mattaponi River, however the shoreline that Dewberry created to extend Hazus functionality along the York River is simplified near the Town of West Point. However **Figure 7** shows that Dewberry still utilized the appropriate "Starting Stillwater Elevations" as published in FIS Table 2 – Transect Descriptions. Consequently, the combination of **Figures 5 through 7** are shown to exemplify how Dewberry performed the Level 1 coastal shoreline work; i.e., matching the FIS as closely as possible. Other counties were not as simple and in some cases engineering judgments were applied to 1.) Simplify the shoreline sub-divisions coupled with 2.) Applying average water surface elevations and wave heights or in some cases applying a weighted average of water surface elevations and wave heights.

Figure 5: Hazus Shorelines for King and Queen County vs. FIS Transect Map

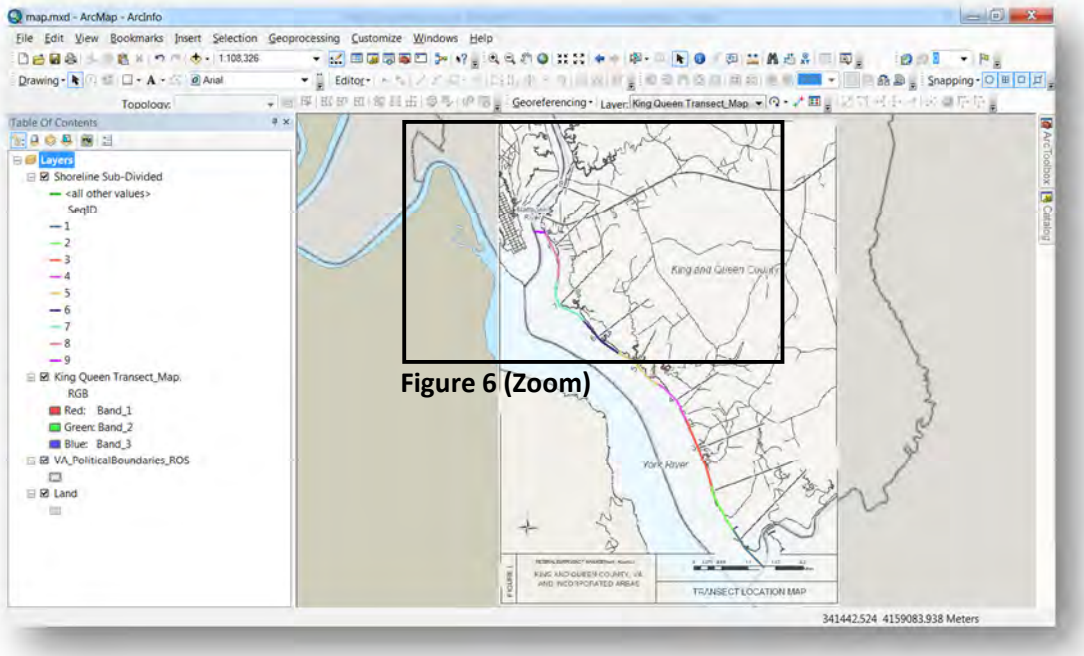


Figure 6: Hazus Shorelines for King and Queen County vs. FIS Transect Map (Zoom)

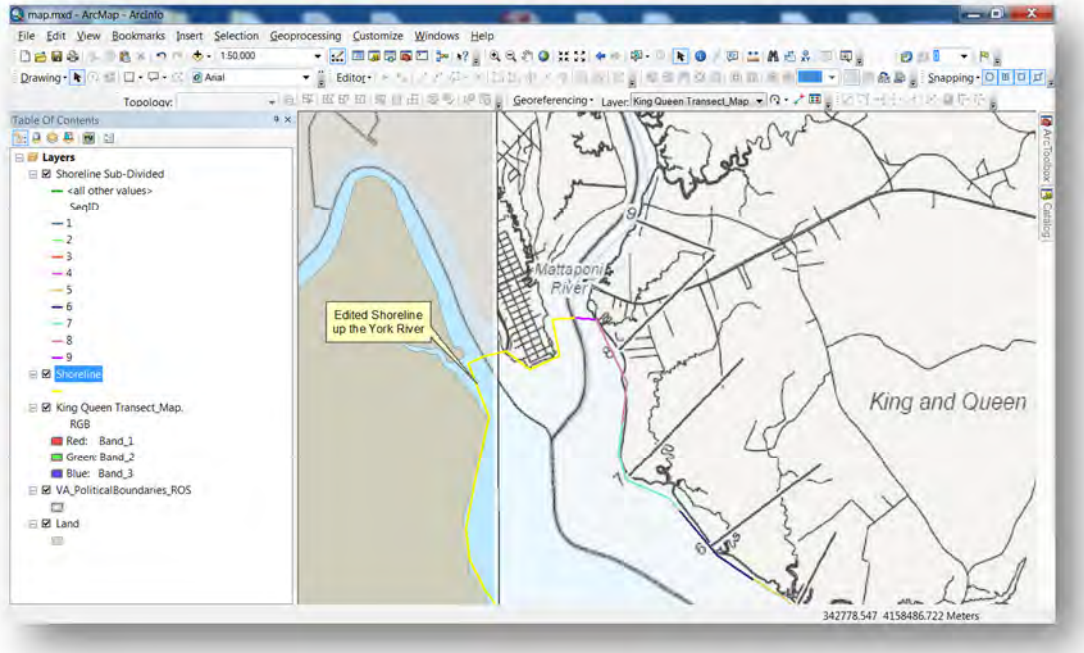
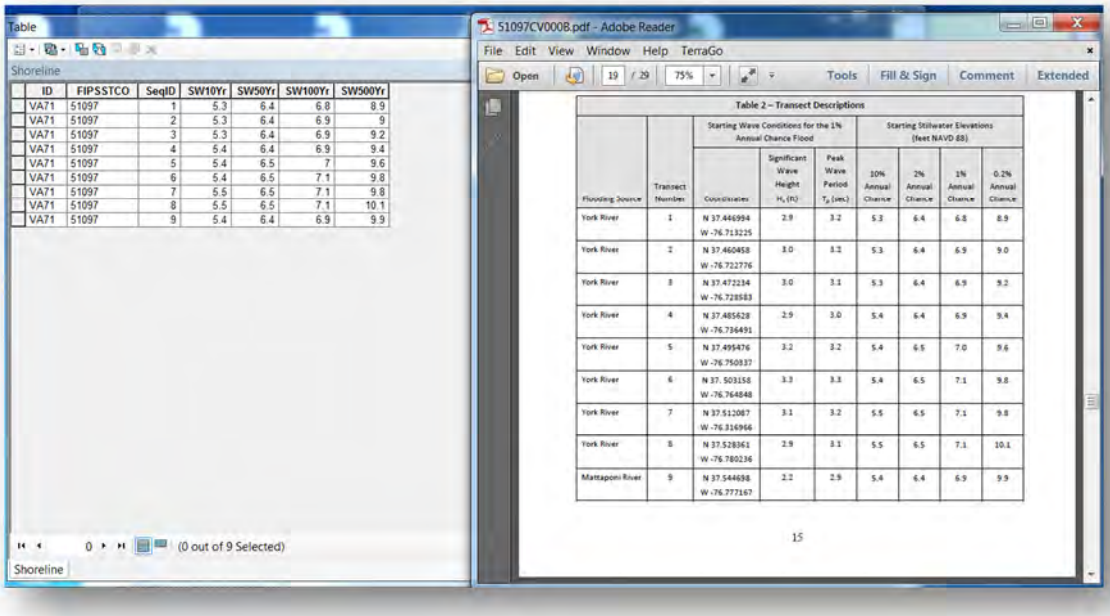
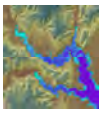


Figure 7: Hazus Shoreline Data for King and Queen County vs. FIS Table 2

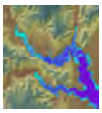


- **Issue 4**:
    - Issue: The 0.2% Annual Chance flood hazard (500 Year) of Gloucester County appears to be significantly under-estimated.
    - Solution: Discuss the matter with MPPDC and substitute the 500 Year depth grid from the previous Plan effort.
    - Other Discussion: As discussed earlier, Dewberry made multiple attempts (as necessary) to produce coastal analyses results for each of the MPPDC counties. Gloucester presented the greatest challenge and the 500 Year flood hazard of the Level 1 methodology did not produce a result that – as compared to the new digital FIRM data – seemed reasonable to use. Therefore, Dewberry contacted the MPPDC and offered the option of substituting the 500 Year depth grid from the previous Plan effort as an alternative solution. The MPPDC agreed that while the previous Plan 500 Year depth grid likely over-estimates the potential hazard, it is better to side with caution and Plan around a conservative approach. It is also important to note that Dewberry compared the Level 1 hazard delineations in all counties with the new digital FIRM data. While the digital FIRM data only includes delineations of 1% and 0.2% (100 Year & 500 Year) flood hazard, a visual comparison offers a minimal means by which to gauge how well the Hazus hazard delineations are being created. All issues and challenges being equal, Dewberry is satisfied that the Level 1 delineations are perfectly acceptable for the nature of the work – Hazard Mitigation Planning.



- **Issue 5**:
  - Issue: Level 2 Coastal Risk MAP 1% Annual Chance (100 Year) losses greater than Level 1 0.2% Annual Chance (500 Year) losses.
  - Solution: Do not substitute the Level 2 Coastal Risk MAP 1% Annual Chance (100 Year) for the Level 1 Coastal 1% Annual Chance (100 Year) in the calculation of annualized results. Rather, produce a separate result for comparison of the 100 Year coastal only.
  - Discussion: Original intent was to substitute the new Risk MAP 1% Annual Chance (100 Year) depth grid and subsequent losses for the Hazus-generated Level 1 Coastal 1% Annual Chance (100 Year) depth grid and subsequent losses. However, noting that the new Risk MAP 100 Year depth grid would have been created with much greater detail in all aspects as discussed in detail under **Issue 6** (below) the most appropriate solution is to separate the runs and respective results for comparative purposes. Furthermore, noting the goal and expectation of the Risk MAP Program as well as the nature of Hazard Mitigation Planning; as new, updated or more detailed analyses are available, professionals would endeavor to integrate and utilize new information in the planning, preparation and resilience of communities.

- **Issue 6**:
  - Issue: FEMA Region III concern over the use of Hazus Level 1 functionality.
  - Solution: The solution employed included the suggestion that the MPPDC and Dewberry discuss with FEMA Region III expectations of the Hazus modeling. The call that was held on March 13, 2015 included such discussions. Ultimately, the MPPDC and the Virginia Department of Emergency Management (VADEM) agreed that the Dewberry plan of action was reasonable and appropriate. However, for reference, Dewberry has compiled an explanation of the specific concerns expressed by the Region during the March 13, 2015 call. Dewberry agrees with the Region in that the best data is in-fact the best, however needs to be tempered with the realities of effort, time and cost. The Region expressed concern over the use of the Level 1 methodology which means the Region would prefer the use of the following:
    - Hydrology & Hydraulics (H&H) – preference would be to use data typical of FEMA Risk MAP Flood Insurance Studies (FIS) and Non-Regulatory Depth Grid creation versus the Hazus methodology. Typical H&H for ***coastal studies*** are limited to the development of Stillwater elevations for four (4) frequencies (10, 50, 100 & 500 Yr.) and Static Base Flood Elevations are only mapped for one (1) frequency; namely the 1% annual chance or 100 Year Event. Consequently, even the core H&H of the coastal modeling would require further analyses by qualified coastal engineers and mapping specialists to effectively produce the data required for coastal depth grid creation.



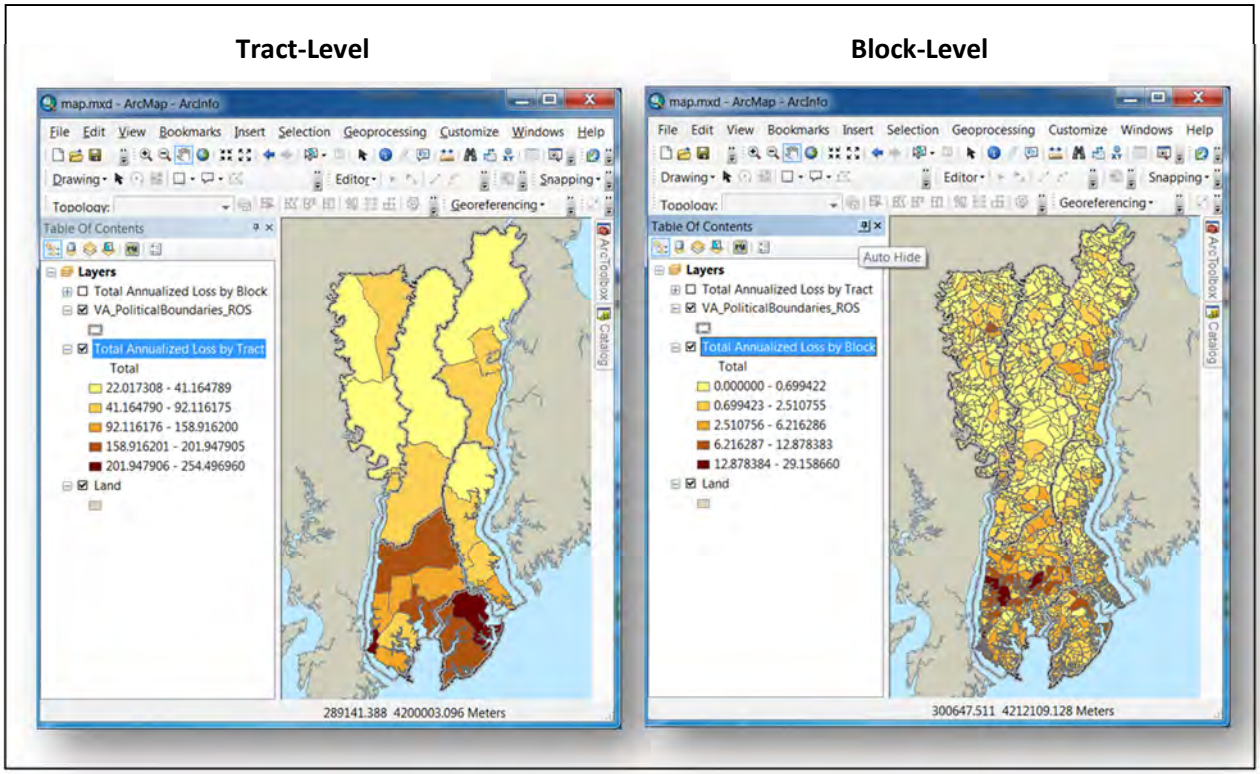
- Topographic Data – preference is to use LiDAR-based topography at a resolution consistent with FEMA Risk MAP Flood Insurance Studies (FIS) and Non-Regulatory Depth Grid creation versus the one-arc second or ~ 30-meter DEM employed.
- Depth Grid Creation – preference is again suggested to develop depth grids consistent with FEMA Risk MAP Non-Regulatory Depth Grid creation which means the use of hydraulic coastal models that have been fully-developed to produce wave-propagated water surface elevations. Again, FEMA flood studies only do this for the 100 Year. Therefore specialized additional work would be required to produce similar data for other frequencies in order to create multi-frequency hazard data that would support the expected annualized analysis typical of Hazard Mitigation Plans. Dewberry again agrees with the Region that there is definitely benefits associated with the most accurate inputs, Dewberry noted on the call that the level of effort to produce such depth grids is quite extensive and typically is not feasible under budgets available for HMP's.

o Other Discussion: As discussed (above) regarding Issue 5, Dewberry has provided the Solution of separating out certain results of the 100 Year Coastal Only Hazus runs so that these can be directly compared. Again, as already noted, over time as more detailed hazard analyses is expected, desired or deemed necessary - future modeling efforts can be sought to produce Risk MAP-based or otherwise detailed depth grids and associated loss analyses.

Hurricane (Wind) Modeling – Probabilistic Scenario

As with the previous Plan, Dewberry again performed a Probabilistic scenario in the Hazus Level 1 Hurricane (Wind) module. Notably, Dewberry ran the scenario in a Region that was created for both Flood and Hurricane as this allows results to be accessed at the census block-level. In contrast, if a Hazus project is created for only Hurricane Hazus will default to using only census tract-level geography. Ultimately, the level of detail that is able to be accessed, displayed and planned for offers a better representation of Hurricane Wind loss when mapped by census block versus census tract. **Figure 8** shows this very comparison.

Figure 8: Hurricane (Wind) Model Results at the Tract versus Block Geography



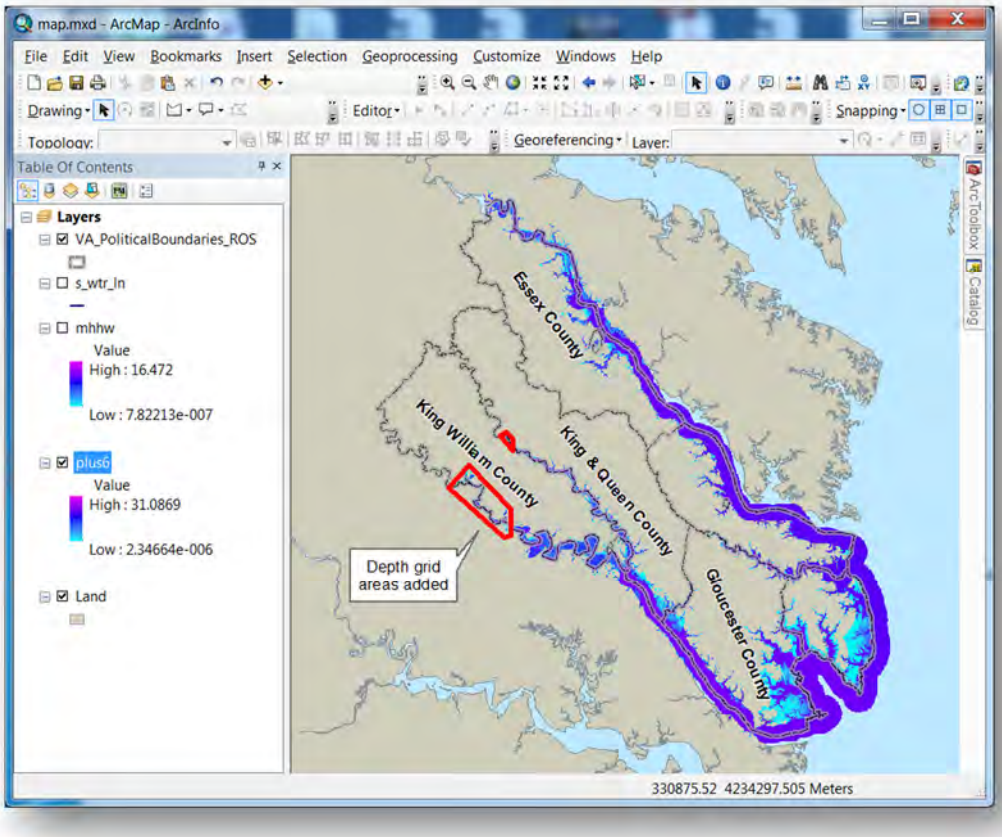
<u>Issues & Challenges Encountered</u>:

None.

Sea Level Rise Modeling – Hazus Flood Model

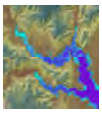
As proposed, Dewberry utilized depth grids available from NOAA Coastal Services Center Sea Level Rise Data. Dewberry obtained and utilized the depth grid of the Mean Higher High Water or Base Scenario and also the Plus 6 feet Sea Level Rise. As a benefit to the MPPDC, Dewberry estimated the addition of depth values in the upstream areas of both the Pamunkey and Mattoponi Rivers; the NOAA depth grids do not extend upstream from these areas as it is the limit of the NOAA data. The method utilized to estimate these small additional areas of depth grid included estimating the water surface elevation where the NOAA depth grids terminated. Next, Spatial Analyst was used to query all elevations in the vicinity that were equal to (or) less than the estimated elevation. The areas were extracted, assigned the estimated water elevation and then converted to a water surface grid. Last the water surface grid was subtracted from the NED one-arc second grid to produce depth values. The additional depth grids were mosaicked with the NOAA grids and ultimately run through the Hazus Flood Module.

Figure 9: Depth Grid Areas Added (Red) where NOAA data terminated



<u>Issues & Challenges Encountered</u>:

None.



Hazus Modeling Results

Dewberry has exported various Hazus modeling results to ESRI File Geodatabase format as standalone GIS layers and tables as necessary. These various result export files will be used to update the HIRA sections to include text, maps and tables. As a benefit to the MPPDC, Dewberry is providing the various result exports to be used as deemed necessary. As scoped, Dewberry is providing final Hazus Project Files – otherwise known as HPR files. A Hazus HPR file is essentially a zipped version of all files that are created by Hazus in the course of a given Hazus project. The HPR archive can be imported on any computer that has an active installation of Hazus Version 2.2. The delivery of HPR's includes an Excel spreadsheet that has basic information about each Hazus Project and HPR file (see **Figure 10**). Importantly, the spreadsheet includes file size information as users need to know how much drive space may be required for a given Hazus Project if they import the HPR file.

- **Results Exports to GIS**:
  - About: Result export files will be used to update the HIRA sections to include text, maps and tables.

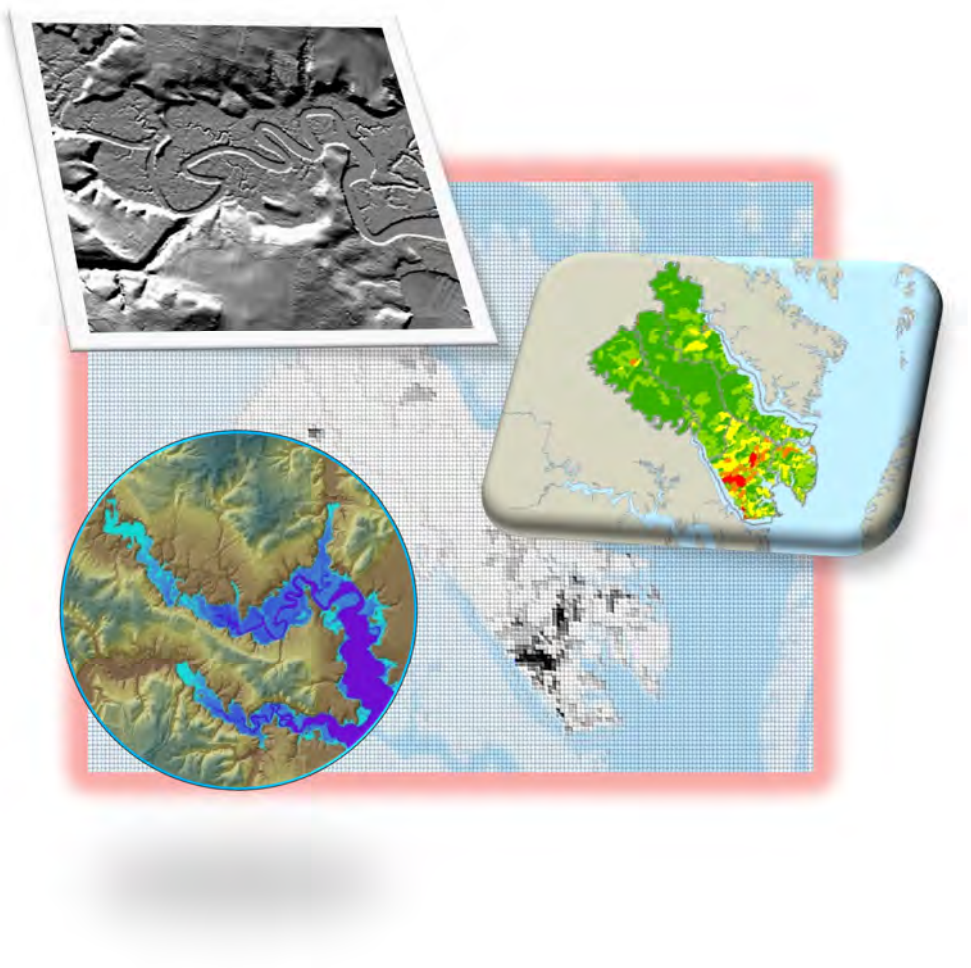
- **Hazus Project Files (HPR)**:
  - About: Zipped version of all files that are created in the course of a given Hazus project.

Figure 10: HPR File Information

Hazard	Application	HPR Name	HPR File Size	Expanded File Size	Info/Source
FLD*	Level 1 Annualized	MPPDC2015_DasymV22.hpr**	407 MB	10.6 GB	Riverine and Coastal Level 1 Annualized Scenarios were run seperately. One-square mile (1 mi^2) drainage threshold used for all Riverine Level 1 modeling. One-Arc Second (~ 30 meter) National Elevation Dataset (NED) Digital Elevation Model (DEM) utilized. All depth grids were extracted and mosaiced into Region-wide depth grids. The Region-wide depth grids were then imported into a new Hazus Project of the entire MPPDC Region and then the loss analysis was run. The Hazus version used in Version 2.2; which includes the new 2010 census-based data. Additionally, the new Hazus Dasymetric General Building Stock (GBS) was used. Note however that final report mapping does not display the losses by dasymetric spatial geometry; rather the results dasymetric data is joined to the stock full block geometry and displayed as such.
	Level 2 RiskMap Coastal 1% (100 YR) Only	MPPDC2015_DasymV22_RskMp100yrDG.hpr**	774 MB	25.3 GB	The depth grids provided by the US Army Corps of Engineers (USACE) were utilized as Level 2 scenario. Dewberry mosaiced all of the 1% (100 YR) depth grids provided and ran them through a Hazus Project created of the entire MPPDC Region. This HPR also includes a second scenario that is the Level 1 depth grid of the coastal-only 1% (100YR) which was run through Hazus for comparison to the Level 2 RiskMap coastal-only 1% (100YR).
	Sea Level Rise Scenarios (Base and Plus 6FT)	MPPDC2015_SLR.hpr**	232 MB	6.92 GB	NOAA depth grids of Sea Level Rise (SLR) utilized per scope of work; Base Scenario or MHHW along with the Plus 6 Feet Scenario.
HUR*	Probabilistic	MPPDC2015_HUR_ByBlockwFLD_Probabilistic.hpr	163 MB	3 GB	Hurricane model probilistic was run with new 2010 inventory provided by MOTF.

*NOTES: All Hazus Model Runs using Version 2.2
All Hazus Flood Model Runs using Version 2.2 Dasymetric Data for Virginia.

HAZUS Modeling Report



End

Appendix H –
National Flood Insurance Program Survey

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: ESSEX COUNTY

1. FLOODPLAIN IDENTIFICATION AND MAPPING

Requirement	Recommended Action	Yes/No	Comments
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	All information is on file and available in the Essex County Building and Zoning Department
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Yes	Adopted April 14, 2015 by the Essex County Board of Supervisors
c. Does the municipality support request for map updates?	If yes, state how.	Yes	We assist citizens in all their requests
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	No	We reviewed the maps and gave our opinion of history of areas
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Yes	We require property owners to get elevation certifications when in question
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Yes	Essex County Building & Zoning Department (202 South Church Lane Tappahannock, VA 22560

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	No	?
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Yes	Building and Zoning Dept.
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Yes	
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Yes	
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Yes	

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Yes	Education certificates

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	Yes	Community meetings/ FEMA
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Yes	Public notice, local newspaper
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	Y	We review maps, explain scenarios. Refer property owners to insurance companies

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: TOWN OF TAPPAHANNOCK

1. FLOODPLAIN IDENTIFICATION AND MAPPING

Requirement	Recommended Action	Yes/No	Comments
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	yes	
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	5-4-2015	
c. Does the municipality support request for map updates?	If yes, state how.	no	We forward anyone who has a request to FEMA
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	yes	By forwarding information to FEMA
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	yes	With the assistance of Essex County Building Inspector office
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	no	

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.		
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.		
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.		
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.		
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.		
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.		

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.		

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.		
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.		
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.		

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: GLOUCESTER COUNTY

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Y	On the emergency management website.
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Y	FIRM adopted by BOS
c. Does the municipality support request for map updates?	If yes, state how.	N	
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	?	We provide VDEM with information and not directly to FEMA
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Y	Planning Development, Building officials and EM assist
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Y	County Administration

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Y	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.		Permits Building officials
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Y	Planning, Building Officials, Information Technology
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Y	Building Official, Planning
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Y	Code Compliance, Building Officials
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Y	BOS, County Adminsitration

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Y	Established VE construction zone

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	Y	CRS-PPI
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Y	CRS-PPI
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	Y	CRS-PPI

MUNICIPALITY: KING & QUEEN COUNTY

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	Located at the Front Counter of Building/Zoning & Planning Office
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Yes	New maps to be adopted around May of 2016 once letter of determination is received from FEMA in November of 2015
c. Does the municipality support request for map updates?	If yes, state how.	?	
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	No	N/A
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Yes	Only as found on the adopted FEMA Flood Maps, field determination/Flood Elevation Certificate is to be done by surveyor (required for all flood zones other than X)
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	yes	Planning & Zoning Department

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Yes	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Yes	Planning & Zoning Department
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Yes	Planning & Zoning Department
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	Planning & Zoning Department
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Yes	Planning & Zoning Department
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Yes	Require Flood Elevation Certificates for all construction located in a floodplain other than Zone X

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Yes	Our new proposed ordinance and map adoption will require free board and recognize LimWa

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	Yes	FEMA Handouts
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Yes	During latest map change, all property owners were notified by U.S. mail and news article for an Open House held in November of 2014.
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	No	

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: KING WILLIAM COUNTY

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	*Recommended Action*	*Yes/No*	*Comments*
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	Available from County Building and Planning Department
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Yes	9/2/15
c. Does the municipality support request for map updates?	If yes, state how.	Yes	
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	No	
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Yes	Provided information to FEMA
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Yes	Building and Planning Department

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Yes	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Yes	Building and Planning Department
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Yes	Building and Planning Department
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	Building and Planning Department
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	No	
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	No	

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Yes	Considered CRS but decided not to pursue at the time Adopted BFE over minimum

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	No	
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Yes	Mailings & Community Meeting
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	Yes	Provided FEMA contact and website information

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: _____URBANNA_____

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	4-22-15	
c. Does the municipality support request for map updates?	If yes, state how.	Yes	Town staff will assist update requests
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	Yes	All data obtained by the town will be forwarded to State Floodplain Coordinating Office (DCR) for their assistance in forwarding to the appropriate FEMA offices
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	No	
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Yes	Town Zoning Office

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Yes*	*Middlesex County provides cooperative administration of the Floodplain Ordinance. County Building Official is co-administrator for the Town. See Middlesex Co. for additional information
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.		
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.		
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.		
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.		
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Yes	All construction requiring a building permit and/or land disturbance permit receives site visits and stop work orders can be issued if violations are found.

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Yes	Investigating the feasibility of participating in the CRS program

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	Yes	Brochure/periodic web site info
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Yes	Direct notification of effected land owners
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	Yes	Information and Referral

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: MATHEWS COUNTY

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	Available in the Building Department and online VIA FEMA MSC link on County website
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	yes	Effective date is 12-09-2014
c. Does the municipality support request for map updates?	If yes, state how.	yes	Providing assistance and guidance through the process
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	yes	Enforcing requirements as adopted in floodplain management ordinance
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	yes	On a daily basis by reviewing FIRM's and making interpretations and determinations
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	yes	Building Department

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	yes	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	yes	Flood zone permit, building permits, etc (Building Department)
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	yes	Per our floodplain management ordinance (Building Department)
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	USBC and floodplain management ordinance enforcement; plan review process (Building Department)
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	yes	FEMA elevation certificate required for new construction and substantial improvement (Building Department)
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	yes	Permitting process; inspections; and requiring elevation certificates be submitted for verification

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	yes	Higher standards were considered, but were not adopted at this time; minimum required standards were adopted.

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	yes	Online info; handouts; various presentations and community events
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	yes	Every single property owner was notified VIA mail regarding map changes and the new ordinance. In addition the public was notified VIA newspaper ads, online ads, PSA's (radio)
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.		Not specifically regarding insurance, but assistance is provided to ensure both FEMA-NFIP requirements are met and the requirements of the floodplain management ordinance are met. Assistance is also provided for flood zone determinations and providing FIRMettes. ICC letters are also provided if documentation is submitted (as required).

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: MIDDLESEX COUNTY, VA

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	*Recommended Action*	*Yes/No*	*Comments*
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Yes	
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Yes	3-3-15
c. Does the municipality support request for map updates?	If yes, state how.	N	Not Asked
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	N	
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Yes	Review FIRM Map, Required Elevation Certification
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Yes	Flood Plain Manager/Planning Department

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Yes	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Yes	Building Department
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Yes	Planning Department
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Yes	Building Department
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Yes	Building Department
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Yes	Inspections and Notices of Violation

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	NO	

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	No	
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	No	
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	No	

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

MUNICIPALITY: TOWN OF WEST POINT

1. FLOODPLAIN IDENTIFICATION AND MAPPING

Requirement	Recommended Action	Yes/No	Comments
a. Does the municipality maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the municipality maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	Y	
b. Has the municipality adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	Y	Adopted by Town Council on 8/10/2015. Sent to FEMA, waiting for approval
c. Does the municipality support request for map updates?	If yes, state how.	N	
d. Does the municipality share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	Y	We would if we had data that resulted in map revisions
e. Does the municipality provide assistance with local floodplain determinations?	If yes, specify how.	Y	We have new maps that we supply citizens and agents with
f. Does the municipality maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	Y	Community Development

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the municipality adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	Y	
(1) Does the municipality issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	Y	Community development and building official
(2) Does the municipality obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	Y	Community development
(3) Does the municipality identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	Y	Community development and building official
(4) Does the municipality document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	Y	Community Development and building official
b. If a compliant floodplain ordinance was adopted, does the municipality enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	Y	Notice of violations would be mailed. Notification to owner and applicant

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
c. Has the municipality considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	Y	Considered CRS

3. FLOOD INSURANCE			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the municipality educate community members about the availability and value of flood insurance?	If yes, specify how.	Y	When requested and community meetings
b. Does the municipality inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	Y	When requested and community meetings
c. Does the municipality provide general assistance to community members regarding insurance issues?	If yes, specify how.	Y	When requested, suggest they speak to insurance agents

NATIONAL FLOOD INSURANCE PROGRAM (NFIP) SURVEY

TRIBE: ___UPPER MATTAPONI INDIAN TRIBE_____

1. FLOODPLAIN IDENTIFICATION AND MAPPING			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Does the tribe maintain accessible copies of an effective Flood Insurance Rate Map (FIRM)/Digital Flood Insurance Rate Map (DFIRM)? Does the tribe maintain accessible copies of the most recent Flood Insurance Study (FIS)?	Place these documents in the local libraries or make available publicly.	No	
b. Has the tribe adopted the most current DFIRM/FIRM and FIS?	State the date of adoption, if approved.	No	
c. Does the tribe support request for map updates?	If yes, state how.	No	
d. Does the tribe share with Federal Emergency Management Agency (FEMA) any new technical or scientific data that could result in map revisions within 6 months of creation or identification of new data?	If yes, specify how.	No	
e. Does the tribe provide assistance with local floodplain determinations?	If yes, specify how.	No	
f. Does the tribe maintain a record of approved Letters of Map Change?	If yes, specify the responsible office.	No	

2. FLOODPLAIN MANAGEMENT			
Requirement	***Recommended Action***	***Yes/No***	***Comments***
a. Has the tribe adopted a compliant floodplain management ordinance that, at a minimum, regulates the following:	If yes, answer questions (1) through (4) below.	No	
(1) Does the tribe issue permits for all proposed development in the Special Flood Hazard Areas (SFHAs)?	If yes, specify the office responsible.	No	
(2) Does the tribe obtain, review, and utilize any Base Flood Elevation (BFE) and floodway data, and/or require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres?	If yes, specify the office responsible.	No	
(3) Does the tribe identify measures to keep all new and substantially improved construction reasonably safe from flooding to or above the BFE, including anchoring, using flood-resistant materials, and designing or locating utilities and service facilities to prevent water damage?	If yes, specify the office responsible.	No	
(4) Does the tribe document and maintain records of elevation data that document lowest floor elevation for new or substantially improved structures?	If yes, specify the office responsible.	No	
b. If a compliant floodplain ordinance was adopted, does the tribe enforce the ordinance by monitoring compliance and taking remedial action to correct violations?	If yes, specify how.	No	

2. FLOODPLAIN MANAGEMENT			
Requirement	*Recommended Action*	*Yes/No*	*Comments*
c. Has the tribe considered adopting activities that extend beyond the minimum requirements? Examples include: • Participation in the Community Rating System • Prohibition of production or storage of chemicals in SFHA • Prohibition of certain types of structures, such as hospitals, nursing homes, and jails in SFHA • Prohibition of certain types of residential housing (manufactured homes) in SFHA • Floodplain ordinances that prohibit any new residential or nonresidential structures in SFHA	If yes, specify activities.	No	

3. FLOOD INSURANCE			
Requirement	*Recommended Action*	*Yes/No*	*Comments*
a. Does the tribe educate community members about the availability and value of flood insurance?	If yes, specify how.	No	
b. Does the tribe inform community property owners about changes to the DFIRM/FIRM that would impact their insurance rates?	If yes, specify how.	No	
c. Does the tribe provide general assistance to community members regarding insurance issues?	If yes, specify how.	No	

Appendix I –
Dams in the Middle Peninsular Region

County	Dam Name	Hazard Potential Classification	Dam Type	Year Constructed	Purposes	Dam Height (ft)	Emergency Action Plan - date of last revision
Middlesex County	Healys Dam	Undetermined	Earth	1930	Recreation	15	N
Middlesex County	Barricks Dam	Undetermined	Earth	1900	Other	18	N
Middlesex County	Conrads Dam	Undetermined	Earth	1900	Recreation	12	N
Middlesex County	Beazley Dam	Undetermined	Earth	1870	Recreation Other	16	N
Middlesex County	Burch Mill Dam	Undetermined	Earth	1900	Recreation	15	N
Middlesex County	Rosegill Upper Dam	Undetermined	Earth	1960	Irrigation	9	N
Middlesex County	Corbin Hall Farm Dam	Undetermined	Earth	1945	Irrigation	9	N
Middlesex County	Hilliards Mill Pond Dam	Low	Earth	1930	Recreation	10.4	Y - 6/14/2010
Middlesex County	Buckingham Dam	Undetermined	Earth	no record	Recreation	17	N
Middlesex County	Grays Dam	Undetermined	Earth	1956	Irrigation/ Recreation	18	N
Middlesex County	Town Bridge Pond Dam	Undetermined	Earth	no record	Recreation	13	N
Middlesex County	Lower Rosegill Lake Dam	Undetermined	Earth	no record	Irrigation/ Recreation	10	N
Middlesex County	Harbor View	Undetermined	no record	no record	no record	10	No Record
Middlesex County	Bristow Dam	Undetermined	no record	no record	no record	14	No Record
Middlesex County	B&LB Dam	Undetermined	no record	no record	no record	12	No Record
Middlesex County	Healys Mill Dam	Undetermined	no record	no record	no record	18.5	N
Middlesex County	Lakeview Drive Dam	Undetermined	Earth	1966	Recreation	18	No Record
Essex County	Hunters Mill Dam	Undetermined	Earth	1850	Recreation	No Record	No Record
Essex County	Taliaferro Mill Dam	Undetermined	Earth	no record	Recreation	12	N
Essex County	Spindles Mill Dam	Undetermined	Earth	1800	Recreation	13	N
Essex County	Hundley Dam	Undetermined	Earth	1955	Recreation	11	N
Essex County	Cheatswood Mill Dam	Undetermined	Earth	1950	Recreation	16	No Record
Essex County	Scotts Millpond Dam	Undetermined	Earth	1850	Recreation	17	N
Essex County	Essex Mill Dam	Undetermined	Earth	1850	Recreation	5.9	No Record
Essex County	Baylors Dam	Undetermined	Earth	1860	Recreation	14	N
Essex County	Millers Dam	Undetermined	Earth	no record	Recreation	23	N

County	Dam Name	Hazard Potential Classification	Dam Type	Year Constructed	Purposes	Dam Height (ft)	Emergency Action Plan - date of last revision
Essex County	Ware Dam	Undetermined	Earth	no record	Recreation	16	No Record
Essex County	Hundley Dam	Undetermined	Earth	1953	Irrigation/Recreation	18	No Record
Essex County	Rose Hill Dam	Undetermined	Earth	1966	Recreation	14	N
Essex County	Wrights Millpond Dam	Undetermined	Earth	no record	Recreation	17	N
Essex County	Cedar Creek Dam	Undetermined	Earth	no record	Recreation	18	N
Essex County	Cedar Creek Lower Dam	Undetermined	Earth	no record	Recreation	12	N
Essex County	Cortney Dam	Undetermined	Earth	no record	Recreation	21	N
Essex County	Dillard Dam	Undetermined	Earth	no record	Recreation	18	N
Essex County	Lewis Dam	Undetermined	no record	no record	no record	26	N
Essex County	Courtney Dam	Undetermined	no record	no record	no record	20.5	N
Essex County	Purkins HOA Dam	Undetermined	no record	no record	no record	17.5	N
Essex County	Penniston Dam	Undetermined	no record	no record	no record	17.25	N
Essex County	Ball Dam	Undetermined	no record	no record	no record	21.5	No Record
Essex County	Taliaferro Dam	Undetermined	no record	no record	no record	20.75	N
Gloucester County	Woodberry Farm Dam	Undetermined	Earth	1930	Irrigation/Recreation	8	N
Gloucester County	Weaver Dam	Undetermined	Earth	1930	Irrigation/Recreation	6	No Record
Gloucester County	Haynes Dam	Undetermined	Earth	1990	Recreation	15	N
Gloucester County	Robins Dam	Undetermined	Earth	1800	Recreation	16	N
Gloucester County	Cow Creek Dam	High	Earth	1935	Recreation	16	Y- 4/15/2021
Gloucester County	Burke Dam	Undetermined	Earth	1920	Recreation	21	Y
Gloucester County	Thousand Trails Dam	Undetermined	Earth	1971	Recreation	15	N
Gloucester County	Haines Pond Dam	Undetermined	Earth	no record	Recreation	9	NR
Gloucester County	Beaverdam Lake Dam	High	Earth	1990	Water Supply	39	Y- 12/22/2014
Gloucester County	Wood Duck Pond Dam	Low	Earth	1970	Recreation	12.7	Y
Gloucester County	Leigh Pond Dam	Undetermined	no record	no record	no record	12	N
Gloucester County	Laneview Dam	Undetermined	no record	no record	no record	17	N
Gloucester County	New Upton Farms Dam	Undetermined	Earth	no record	Other	No Record	No Record

County	Dam Name	Hazard Potential Classification	Dam Type	Year Constructed	Purposes	Dam Height (ft)	Emergency Action Plan - date of last revision
King and Queen County	Walkerton Mill Dam	Undetermined	Earth	1870	Recreation	22	N
King and Queen County	King and Queen Courthouse Dam	Undetermined	Earth	1990	Recreation	12	No Record
King and Queen County	Fleets Millpond Dam	Undetermined	Earth	1800	Recreation	13	N
King and Queen County	Allens Mill Dam	Undetermined	Earth	1990	Recreation	14	No Record
King and Queen County	Corbin Mill Dam	Undetermined	Earth	1900	Recreation	13	N
King and Queen County	Gressitt Dam	Undetermined	Earth	1900	Recreation	14	N
King and Queen County	Spring Branch Dam	Significant	Earth	no record	Fish & wildlife or small farm pond	45	N
King and Queen County	Stevensville Dam	Undetermined	Earth	1920	Other	10	N
King and Queen County	Powers Dam	Undetermined	Earth	1975	Fish & wildlife or small farm pond	21	N
King and Queen County	Townsend Dam	Undetermined	Earth	no record	Irrigation/Recreation	20	N
King and Queen County	Wyatts Dam	Undetermined	Earth	no record	Recreation	10	N
King and Queen County	Gwathmeys Dam	Undetermined	Earth	no record	Recreation	24	N
King and Queen County	Kochs Dam	Undetermined	Earth	no record	Recreation	10	N
King and Queen County	Garnett Millpond Dam	Undetermined	Earth	1953	Recreation	15	N
King and Queen County	Dew Dam	Undetermined	Earth	1967	Irrigation	12	No Record
King and Queen County	Ice House Dam	Significant	Earth	no record	Recreation	13	N
King and Queen County	Walker Coleman Dam	Significant	Earth	no record	Recreation	22	N
King and Queen County	Normans Dam	Undetermined	Earth	no record	Recreation	16	N
King and Queen County	Indian Mound Ponds Dam	Undetermined	Earth	no record	Other	10	N

King and Queen County	Smallwood Dam	Undetermined	no record	no record	no record	No Record	No Record
King and Queen County	North Walker Refuge Dam	Undetermined	Earth	no record	no record	27	N
King and Queen County	South Walker Refuge Dam	Undetermined	Earth	no record	no record	15	N
King and Queen County	King and Queen County Dam #1	Undetermined	no record	no record	no record	11.5	N
King and Queen County	King and Queen County Dam #2	Undetermined	no record	no record	no record	8.25	N
King and Queen County	King and Queen County Dam #3	Undetermined	no record	no record	no record	22	No Record
King and Queen County	King and Queen County Dam #4	Undetermined	no record	no record	no record	12	No Record
King and Queen County	King and Queen County Dam #5	Undetermined	no record	no record	no record	27.25	N
King and Queen County	King and Queen County Dam #6	Undetermined	no record	no record	no record	13.75	N
King William County	Olssons Dam	Undetermined	Earth	1932	Recreation	9	N
King William County	Custis Dam	Undetermined	Earth	1920	Recreation	12	N
King William County	Harrell Dam	Undetermined	Earth	1930	Recreation	5.9	No Record
King William County	Cohoke Mill Dam	Undetermined	Earth	1850	Recreation	9	N
King William County	Old Town Farm Dam	Undetermined	Earth	1990	Fish & wildlife or small farm pond	12	N
King William County	Lafferty Dam No. 1	Undetermined	Earth	1990	Fish & wildlife or small farm pond	15	N
King William County	Curling Dam	Undetermined	Earth	1935	Recreation	14	N
King William County	Aylett Mill Dam	Undetermined	Earth	1936	Recreation	20	N
King William County	Gutherie Dam	Undetermined	Earth	1920	Recreation	18	N
King William County	Deckers Dam	Undetermined	Earth	no record	Irrigation/Recreation	16	N
King William County	Dublin Millpond Dam	Undetermined	Earth	no record	Recreation Other	15	N

County	Dam Name	Hazard Potential Classification	Dam Type	Year Constructed	Purposes	Dam Height (ft)	Emergency Action Plan - date of last revision
King William County	Mitchells Millpond Dam	Undetermined	Earth	2008	Recreation	11.28	N
King William County	Herring Creek Millpond Dam	Undetermined	Earth	no record	Recreation Other	15	No Record
King William County	Kellys Dam	Undetermined	Earth	no record	Recreation	24	N
King William County	Hall Dam	Undetermined	Earth	no record	Irrigation/Recreation	12	N
King William County	Gravatts Millpond Dam	Undetermined	Earth	no record	Recreation Other	17	No Record
King William County	Fogg Dam	Undetermined	Earth	1965	Recreation	12	N
King William County	Garretts Dam	Undetermined	Earth	no record	Recreation	18	N
King William County	Townsends Dam #2	Undetermined	Earth	1964	Recreation	17	No Record
King William County	Townsends Dam #1	Undetermined	Earth	1951	Recreation	12	N
King William County	Boshers Mill Pond	Undetermined	Earth	no record	Fish & wildlife or small farm pond	12	N
King William County	Johnsons Dam	Undetermined	Earth	no record	Recreation	22	N
King William County	Hays Farm Dam	Undetermined	Earth	no record	Recreation	10	N
King William County	Lafferty Dam #2	Undetermined	Earth	1960	Irrigation	16	No Record
King William County	Chelsea Dam	Undetermined	Earth	no record	Irrigation	12	N
King William County	Central Crossing Dam	Low	Earth	no record	Recreation	32.2	Y -2/25/2010
King William County	King William Reservoir	Undetermined	Earth	1900	Water Supply	88	No Record
King William County	Lancaster Road Dam	Undetermined	no record	no record	no record	27	N
King William County	Dabneys Millpond Dam	Undetermined	Earth	no record	Recreation	11	N
King William County	McGeorge Pond Dam	Undetermined	Earth	1960	Recreation	17	N

County	Dam Name	Hazard Potential Classification	Dam Type	Year Constructed	Purposes	Dam Height (ft)	Emergency Action Plan - date of last revision
King William County	Fox Run Dam	Undetermined	no record	no record	no record	19	N
King William County	Smokey Road Dam	Undetermined	no record	no record	no record	15	No Record
King William County	Locust Hill Road West Dam	Undetermined	no record	no record	no record	13	No Record
King William County	Fox Hill Dam	Undetermined	no record	no record	no record	14	N
King William County	Beazley Dam	Undetermined	Earth	no record	Recreation	15	No Record
King William County	King William County Dam #1	Undetermined	no record	no record	no record	11.5	N
King William County	King William County Dam #2	Undetermined	no record	no record	no record	10	No Record
King William County	King William County Dam #3	Undetermined	no record	no record	no record	12	N
King William County	King William County Dam #4	Undetermined	no record	no record	no record	22	No Record
King William County	King William County Dam #5	Undetermined	no record	no record	no record	13.75	N
King William County	King William County Dam #6	Undetermined	no record	no record	no record	14.25	No Record
King William County	King William County Dam #7	Undetermined	no record	no record	no record	47.3	N
King William County	King William County Dam #8	Undetermined	no record	no record	no record	29.5	N
King William County	King William County Dam #9	Undetermined	no record	no record	no record	15.5	N
King William County	King William County Dam #10	Undetermined	no record	no record	no record	17.5	N
King William County	King William County Dam #11	Undetermined	no record	no record	no record	23	N
King William County	King William County Dam #12	Undetermined	no record	no record	no record	10	N
King William County	King William County Dam #13	Undetermined	no record	no record	no record	37.8	N
King William County	Acquinton Dam	Undetermined	Earth	1900	Agriculture	31	N

Appendix J –
Tornado History in the Middle Peninsula Region (1950-2021)

List of Tornadoes that have touched down in the Middle Peninsula from 1950-2021 (NOAA National Centers for Environmental Information, 2021).

Location	County/Zone	Date	Time	T.Z.	Tornado Magnitude	Death	Injury
ESSEX CO.	ESSEX CO.	6/26/1954	19:00	CST		0	0
TAPPAHANNOCK	ESSEX CO.	5/8/2003	14:15	EST	F0	0	0
HOWERTONS	ESSEX CO.	2/24/2016	18:37	EST-5	EF3	0	25
GLOUCESTER CO.	GLOUCESTER CO.	4/25/1975	16:00	CST	F1	0	4
GLOUCESTER CO.	GLOUCESTER CO.	8/14/1975	19:10	CST	F0	0	0
GLOUCESTER CO.	GLOUCESTER CO.	8/24/1975	22:30	CST	F1	0	0
GLOUCESTER CO.	GLOUCESTER CO.	9/5/1979	15:30	CST	F1	0	0
GLOUCESTER CO.	GLOUCESTER CO.	5/24/1980	16:50	CST	F1	0	0
SEVERN	GLOUCESTER CO.	7/12/1996	22:05	EST	F0	0	0
WOODS XRDS	GLOUCESTER CO.	7/12/1996	22:15	EST	F0	0	0
TIDEMILL	GLOUCESTER CO.	7/15/1996	18:30	EST	F1	0	0
PERRIN	GLOUCESTER CO.	3/9/1998	5:30	EST	F0	0	0
SIGNPINE	GLOUCESTER CO.	4/27/2007	11:30	EST-5	EF0	0	0
GUM FORK	GLOUCESTER CO.	4/28/2008	15:55	EST-5	EF0	0	0
COKE	GLOUCESTER CO.	4/16/2011	18:00	EST-5	EF3	2	24
BENA	GLOUCESTER CO.	10/11/2018	18:22	EST-5	EF0	0	0
CASH	GLOUCESTER CO.	10/11/2018	18:47	EST-5	EF0	0	0
BENA	GLOUCESTER CO.	4/19/2019	19:20	EST-5	EF0	0	0
COKE	GLOUCESTER CO.	8/4/2020	3:53	EST-5	EF1	0	0
KING AND QUEEN CO.	KING AND QUEEN CO.	5/11/1951	15:00	CST	F1	0	0
West Point	KING AND QUEEN CO.	10/5/1995	13:20	EST	F1	0	0
KING & QUEEN CHURCH	KING AND QUEEN CO.	5/2/2004	21:30	EST	F1	0	0
MILLERS TAVERN	KING AND QUEEN CO.	1/14/2006	2:15	EST	F0	0	0
LITTLE PLYMOUTH	KING AND QUEEN CO.	9/28/2006	19:35	EST	F1	0	0
POWCAN	KING AND QUEEN CO.	5/22/2014	17:05	EST-5	EF0	0	0
BRUINGTON	KING AND QUEEN CO.	2/24/2016	18:34	EST-5	EF1	0	0
KING WILLIAM CO.	KING WILLIAM CO.	7/13/1975	19:20	CST	F0	0	0
KING WILLIAM CO.	KING WILLIAM CO.	10/18/1990	15:00	CST	F3	1	0
AYLETT	KING WILLIAM CO.	9/8/2004	13:05	EST	F0	0	0
ENFIELD	KING WILLIAM CO.	4/20/2008	14:58	EST-5	EF0	0	0
MANQUIN	KING WILLIAM CO.	4/20/2008	17:25	EST-5	EF0	0	0
MIDWAY	KING WILLIAM CO.	4/20/2008	17:28	EST-5	EF0	0	0
ETNA MILLS	KING WILLIAM CO.	5/31/2008	15:52	EST-5	EF0	0	0
LANESVILLE	KING WILLIAM CO.	10/24/2017	2:00	EST-5	EF0	0	0
MATHEWS CO.	MATHEWS CO.	4/25/1975	16:15	CST	F1	0	0
MATHEWS CO.	MATHEWS CO.	3/30/1989	16:15	EST	F1	0	0

Location	County/Zone	Date	Time	T.Z.	Tornado Magnitude	Death	Injury
GWYNN	MATHEWS CO.	7/14/2000	19:09	EST	F0	0	0
MOBJACK	MATHEWS CO.	4/28/2008	15:45	EST-5	EF1	0	0
NORTH	MATHEWS CO.	4/28/2008	16:05	EST-5	EF0	0	0
NORTH	MATHEWS CO.	4/16/2011	18:18	EST-5	EF3	0	0
MOTORUN	MATHEWS CO.	2/24/2012	18:25	EST-5	EF0	0	0
MIDDLESEX CO.	MIDDLESEX CO.	7/15/1976	17:00	CST	F1	0	0
MIDDLESEX CO.	MIDDLESEX CO.	5/11/1981	15:30	CST	F2	0	0
Urbanna	MIDDLESEX CO.	8/6/1993	14:00	EST	F3	0	0
DELTAVILLE	MIDDLESEX CO.	7/14/2000	18:08	EST	F0	0	0
SALUDA	MIDDLESEX CO.	7/8/2005	2:15	EST	F1	0	0
SAMOS	MIDDLESEX CO.	4/16/2011	17:30	EST-5	EF1	0	0
RUARK	MIDDLESEX CO.	4/16/2011	18:25	EST-5	EF2	0	0
MORATTICO	MIDDLESEX CO.	2/24/2016	20:25	EST-5	EF0	0	0
WARNER	MIDDLESEX CO.	2/24/2016	20:35	EST-5	EF1	0	0
JAMAICA	MIDDLESEX CO.	10/11/2018	19:13	EST-5	EF0	0	0

Appendix K –
Wildfires within the Middle Peninsula 2015 – December 2020 (VDOF, 2021)

Fire Number	County Name	Fire Origin Type	General Cause	Specific Cause	Fire Start	Total Acres Impacted	Forest Acres Impacted	Non Forest Acres Impacted
ESS15001	Essex	Virginia - Non Federal	Smoking	Smoking	3/16/2015	0.10	0.10	0.00
ESS15002	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	4/22/2015	3.00	3.00	0.00
ESS16001	Essex	Virginia - Non Federal	Debris Burning	Prescribed Burn	3/26/2016	4.00	4.00	0.00
ESS16002	Essex	Virginia - Non Federal	Equipment Use	Equipment Malfunction	10/24/2016	31.00	1.00	30.00
ESS16003	Essex	Virginia - Non Federal	Equipment Use	Equipment Malfunction	10/31/2016	0.10	0.10	0.00
ESS17001	Essex	Virginia - Non Federal	Debris Burning	Other Debris Burn	2/7/2017	0.10	0.10	0.00
ESS17002	Essex	Virginia - Non Federal	Incendiary	Incendiary	2/26/2017	0.50	0.50	0.00
ESS17003	Essex	Virginia - Non Federal	Incendiary	Incendiary	2/26/2017	0.10	0.10	0.00
ESS17004	Essex	Virginia - Non Federal	Equipment Use	Equipment Malfunction	3/12/2017	3.00	3.00	0.00
ESS18001	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.70	0.50	0.20
ESS18002	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.20	0.10	0.10
ESS18003	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.20	0.10	0.10
ESS18004	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	3/3/2018	6.20	6.00	0.20
ESS18005	Essex	Virginia - Non Federal	Debris Burning	Prescribed Burn	5/2/2018	15.00	11.80	3.20
ESS18006	Essex	Virginia - Non Federal	Lightning	Lightning	5/10/2018	0.30	0.30	0.00
ESS19001	Essex	Virginia - Non Federal	Miscellaneous	Powerlines	3/28/2019	7.00	6.50	0.50
ESS19002	Essex	Virginia - Non Federal	Smoking	Smoking	4/24/2019	0.10	0.00	0.10
ESS19003	Essex	Virginia - Non Federal	Equipment Use	Equipment Malfunction	9/27/2019	7.00	2.60	4.40
ESS19004	Essex	Virginia - Non Federal	Equipment Use	Friction/Dragging	9/29/2019	0.10	0.10	0.00
ESS19005	Essex	Virginia - Non Federal	Smoking	Smoking	10/7/2019	0.10	0.10	0.00
ESS20001	Essex	Virginia - Non Federal	Debris Burning	Other Debris Burn	3/20/2020	30.00	30.00	0.00
GLO15001	Gloucester	Virginia - Non Federal	Children	Ages 12 - 17	3/12/2015	0.80	0.00	0.80
GLO15002	Gloucester	Virginia - Non Federal	Debris Burning	Other Debris Burn	3/24/2015	0.70	0.10	0.60
GLO15003	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	4/2/2015	127.00	37.00	90.00
GLO15004	Gloucester	Virginia - Non Federal	Equipment Use	Exhaust	4/2/2015	5.00	3.00	2.00
GLO15005	Gloucester	Virginia - Non Federal	Debris Burning	Other Debris Burn	4/6/2015	0.50	0.50	0.00
GLO15006	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	5/27/2015	11.00	11.00	0.00
GLO16001	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	3/31/2016	130.00	0.00	130.00
GLO16002	Gloucester	Virginia - Non Federal	Equipment Use	Exhaust	4/7/2016	3.00	3.00	0.00
GLO16003	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	4/7/2016	92.00	37.00	55.00
GLO16004	Gloucester	Virginia - Non Federal	Miscellaneous	Spontaneous Heating	8/30/2016	2.00	2.00	0.00
GLO16005	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	9/15/2016	0.30	0.30	0.00
GLO17001	Gloucester	Virginia - Non Federal	Smoking	Smoking	4/10/2017	1.30	1.30	0.00
GLO17002	Gloucester	Virginia - Non Federal	Miscellaneous	Fireworks	7/4/2017	0.40	0.40	0.00
GLO17003	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	12/25/2017	5.90	5.90	0.00
GLO18001	Gloucester	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.30	0.10	0.20
GLO18002	Gloucester	Virginia - Non Federal	Lightning	Lightning	8/5/2018	0.00	0.00	0.00
GLO18003	Gloucester	Virginia - Non Federal	Lightning	Lightning	8/30/2018	0.10	0.10	0.00

Fire Number	County Name	Fire Origin Type	General Cause	Specific Cause	Fire Start	Total Acres Impacted	Forest Acres Impacted	Non Forest Acres Impacted
GLO19001	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	5/22/2019	6.00	3.00	3.00
GLO19002	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	7/3/2019	10.00	8.00	2.00
GLO19003	Gloucester	Virginia - Non Federal	Miscellaneous	Firearms/Ammunition	7/5/2019	22.00	7.00	15.00
GLO19004	Gloucester	Virginia - Non Federal	Lightning	Lightning	7/23/2019	4.00	2.00	2.00
GLO20001	Gloucester	Virginia - Non Federal	Debris Burning	Other Debris Burn	3/5/2020	0.50	0.50	0.00
GLO20002	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	3/5/2020	107.00	107.00	0.00
GLO20003	Gloucester	Virginia - Non Federal	Incendiary	Incendiary	4/10/2020	1.20	1.20	0.00
KAQ15001	King and Queen	Virginia - Non Federal	Debris Burning	Other Debris Burn	2/8/2015	16.00	5.00	11.00
KAQ16001	King and Queen	Virginia - Non Federal	Miscellaneous	Powerlines	4/10/2016	3.50	3.50	0.00
KAQ16002	King and Queen	Virginia - Non Federal	Debris Burning	Prescribed Burn	8/31/2016	2.00	1.00	1.00
KAQ16003	King and Queen	Virginia - Non Federal	Debris Burning	Other Debris Burn	11/19/2016	0.80	0.50	0.30
KAQ17001	King and Queen	Virginia - Non Federal	Miscellaneous	Woodstove Ashes	3/22/2017	0.50	0.50	0.00
KAQ17002	King and Queen	Virginia - Non Federal	Miscellaneous	Powerlines	3/22/2017	1.40	1.00	0.40
KAQ17003	King and Queen	Virginia - Non Federal	Miscellaneous	Other Miscellaneous	3/25/2017	6.30	6.30	0.00
KAQ17004	King and Queen	Virginia - Non Federal	Miscellaneous	Woodstove Ashes	4/8/2017	1.50	1.50	0.00
KAQ17005	King and Queen	Virginia - Non Federal	Equipment Use	Equipment Malfunction	5/15/2017	0.10	0.10	0.00
KAQ18002	King and Queen	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.50	0.40	0.10
KAQ18001	King and Queen	Virginia - Non Federal	Miscellaneous	Powerlines	3/2/2018	0.70	0.70	0.00
KAQ18003	King and Queen	Virginia - Non Federal	Debris Burning	Other Debris Burn	3/3/2018	21.00	21.00	0.00
KAQ18004	King and Queen	Virginia - Non Federal	Debris Burning	Prescribed Burn	3/18/2018	12.00	11.00	1.00
KAQ19001	King and Queen	Virginia - Non Federal	Debris Burning	Other Debris Burn	3/24/2019	1.50	1.50	0.00
KAQ20001	King and Queen	Virginia - Non Federal	Equipment Use	Friction/Dragging	3/7/2020	25.30	25.30	0.00
KAQ20002	King and Queen	Virginia - Non Federal	Equipment Use	Friction/Dragging	3/9/2020	0.10	0.10	0.00
KAQ20003	King and Queen	Virginia - Non Federal	Debris Burning	Trash Burn	5/15/2020	8.00	8.00	0.00
KAQ20004	King and Queen	Virginia - Non Federal	Lightning	Lightning	7/17/2020	41.00	41.00	0.00
KWM15001	King William	Virginia - Non Federal	Miscellaneous	Woodstove Ashes	2/6/2015	1.00	1.00	0.00
KWM15002	King William	Virginia - Non Federal	Debris Burning	Other Debris Burn	4/5/2015	0.30	0.00	0.30
KWM15003	King William	Virginia - Non Federal	Miscellaneous	Powerlines	4/19/2015	0.10	0.10	0.00
KWM15004	King William	Virginia - Non Federal	Equipment Use	Direct Heat Transfer	11/13/2015	0.10	0.10	0.00
KWM16001	King William	Virginia - Non Federal	Smoking	Smoking	2/28/2016	2.50	2.50	0.00
KWM17001	King William	Virginia - Non Federal	Smoking	Smoking	3/8/2017	10.00	10.00	0.00
KWM17002	King William	Virginia - Non Federal	Equipment Use	Friction/Dragging	7/22/2017	3.80	3.70	0.10
KWM18001	King William	Virginia - Non Federal	Debris Burning	Trash Burn	3/4/2018	1.00	0.50	0.50
KWM18002	King William	Virginia - Non Federal	Debris Burning	Trash Burn	3/15/2018	3.00	3.00	0.00
KWM19002	King William	Virginia - Non Federal	Equipment Use	Exhaust	9/21/2019	5.00	4.90	0.10

Fire Number	County Name	Fire Origin Type	General Cause	Specific Cause	Fire Start	Total Acres Impacted	Forest Acres Impacted	Non Forest Acres Impacted
KWM20001	King William	Virginia - Non Federal	Debris Burning	Trash Burn	11/17/2020	5.50	1.50	4.00
MAT16001	Mathews	Virginia - Non Federal	Miscellaneous	Other Miscellaneous	3/23/2016	2.00	0.00	2.00
MAT16002	Mathews	Virginia - Non Federal	Children	Under Age 12	3/31/2016	0.10	0.10	0.00
MAT16003	Mathews	Virginia - Non Federal	Debris Burning	Other Debris Burn	9/5/2016	0.70	0.00	0.70
MAT17001	Mathews	Virginia - Non Federal	Children	Ages 12 - 17	9/29/2017	3.30	3.30	0.00
MAT18001	Mathews	Virginia - Non Federal	Equipment Use	Friction/Dragging	7/20/2018	3.00	3.00	0.00
MAT19001	Mathews	Virginia - Non Federal	Lightning	Lightning	6/16/2019	1.80	0.80	1.00
MAT20001	Mathews	Virginia - Non Federal	Debris Burning	Other Debris Burn	5/4/2020	0.70	0.20	0.50
MID15001	Middlesex	Virginia - Non Federal	Miscellaneous	Firearms/Ammunition	4/5/2015	1.00	1.00	0.00
MID16001	Middlesex	Virginia - Non Federal	Debris Burning	Trash Burn	3/25/2016	0.10	0.00	0.10
MID16002	Middlesex	Virginia - Non Federal	Miscellaneous	Structure Fires	3/29/2016	0.10	0.10	0.00
MID18001	Middlesex	Virginia - Non Federal	Miscellaneous	Powerlines	4/6/2018	3.00	3.00	0.00
MID18002	Middlesex	Virginia - Non Federal	Debris Burning	Other Debris Burn	4/12/2018	0.10	0.10	0.00
MID20001	Middlesex	Virginia - Non Federal	Debris Burning	Trash Burn	3/1/2020	0.20	0.00	0.20

Appendix L–
Gloucester County Stormwater Management Ordinance

Chapter 6 - STORMWATER MANAGEMENT[1]

Pursuant to Virginia Code § 62.1-44.15:27, this ordinance is adopted as part of an initiative to integrate the Gloucester County stormwater management requirements with the Erosion and Sediment Control Ordinance of Gloucester County, Virginia (Chapter 7.5) and the Chesapeake Bay Preservation Ordinance (Chapter 5.5) requirements into a unified stormwater program. The unified stormwater program is intended to facilitate the submission and approval of plans, issuance of permits, payment of fees, and coordination of inspection and enforcement activities into a more convenient and efficient manner for both Gloucester County and those responsible for compliance with these programs.

Footnotes:

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Editor's note—An ordinance adopted Aug. 6, 2013, repealed ch. 6, §§ 6-1—6-13, which pertained to demonstrations and parades. Subsequently, an ordinance adopted June 3, 2014, §§ 1-1—1-16, enacted new provisions to the Code, but did not specify manner of inclusion; hence, codification as ch. 6, §§ 6-1—6-16 was at the discretion of the editor.

Sec. 6-1. - Purpose and authority.

(a) The purpose of this chapter is to ensure the general health, safety, and welfare of the citizens of the county and protect the quality and quantity of state waters from the potential harm of unmanaged stormwater, including protection from a land-disturbing activity causing unreasonable degradation of properties, water quality, stream channels, and other natural resources, and to establish procedures whereby stormwater requirements related to water quality and quantity shall be administered and enforced.

(b) This chapter is adopted pursuant to Article 2.3 (§ 62.1-44.15:24 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

(Ord. of 6-3-2014(1), § 1-1)

Sec. 6-2. - Definitions.

In addition to the definitions set forth in 9VAC25-870-10 of the Virginia Stormwater Management Regulations, as amended, which are expressly adopted and incorporated herein by reference, the following words and terms used in this chapter have the following meanings unless otherwise specified herein. Where definitions differ, those incorporated herein shall have precedence.

"Administrator" means the VSMP authority including the County Administrator, or her designee.

"Agreement in lieu of a stormwater management plan" means a contract between the VSMP authority and the owner or permittee that specifies methods that shall be implemented to comply with the requirements of a VSMP for the construction of a single family residence; such contract may be executed by the VSMP authority in lieu of a stormwater management plan.

"Administrative Guidance Manual" means the latest version of policies and procedures for documentation and calculations verifying compliance with the water quality and quantity requirements, review and approval of Stormwater Pollution Prevention Plans and Stormwater Management Plans, site inspections, obtaining and releasing sureties, reporting and recordkeeping, and compliance strategies for reviews, enforcement, and long-term maintenance and inspection programs.

"Applicant" means any person submitting an application for a permit or requesting issuance of a permit under this chapter.

"Best management practice" or "BMP" means schedules of activities, prohibitions of practices, including both structural and nonstructural practices, maintenance procedures, and other management practices to prevent or reduce the pollution of surface waters and groundwater systems from the impacts of land-disturbing activities.

"Chesapeake Bay Preservation Act land-disturbing activity" means a land-disturbing activity including clearing, grading, or excavation that results in a land disturbance equal to or greater than 2,500 square feet and less than one acre in all areas of jurisdictions designated as subject to the regulations adopted pursuant to the Chesapeake Bay Preservation Act, Virginia Code § 62.1-44.15:67 et seq.

"Common plan of development or sale" means a contiguous area where separate and distinct construction activities may be taking place at different times on different schedules.

"Control measure" means any best management practice or stormwater facility, or other method used to minimize the discharge of pollutants to state waters.

"Clean Water Act" or "CWA" means the federal Clean Water Act (33 U.S.C § 1251 et seq.), formerly referred to as the Federal Water Pollution Control Act or Federal Water Pollution Control Act Amendments of 1972, Public Law 92-500, as amended by Public Law 95-217, Public Law 95-576, Public Law 96-483, and Public Law 97-117, or any subsequent revisions thereto.

"Department" means the Department of Environmental Quality.

"Development" means land disturbance and the resulting landform associated with the construction of residential, commercial, industrial, institutional, recreation, transportation or utility facilities, structures, uses or the clearing of land for non-agricultural or non-silvicultural purposes.

"General permit" means the state permit titled GENERAL PERMIT FOR DISCHARGES OF STORMWATER FROM CONSTRUCTION ACTIVITIES found in Part XIV (9VAC25-880-1 et seq.) of the Regulations authorizing a category of discharges under the CWA and the Act within a geographical area of the Commonwealth of Virginia.

"Land disturbance" or "land-disturbing activity" means a man-made change to the land surface that potentially changes its runoff characteristics including clearing, grading, or excavation except that the term shall not include those exemptions specified in section 6-3(c) of this chapter.

"Layout" means a conceptual drawing sufficient to provide for the specified stormwater management facilities required at the time of approval.

"Locality" or "County" means Gloucester County, Virginia.

"Minor modification" means an amendment to an existing general permit before its expiration not requiring extensive review and evaluation including, but not limited to, changes in EPA promulgated test protocols, increasing monitoring frequency requirements, changes in sampling locations, and changes to compliance dates within the overall compliance schedules. A minor general permit modification or amendment does not substantially alter general permit conditions, substantially increase or decrease the amount of surface water impacts, increase the size of the operation, or reduce the capacity of the facility to protect human health or the environment.

"Municipal separate storm sewer system" or "MS4" means all separate storm sewers that are defined as "large", "medium," or "small" municipal separate storm sewer systems or designated under 9VAC25-870-380(A)(1).

"Operator" means the owner or operator of any facility or activity subject to regulation under this chapter.

"Permit" or "VSMP Authority Permit" means an approval to conduct a land-disturbing activity issued by the Administrator for the initiation of a land-disturbing activity, in accordance with this chapter, and which may only be issued after evidence of general permit coverage has been provided by the Department.

"Permittee" means the person to whom the VSMP Authority Permit is issued.

"Person" means any individual, corporation, partnership, association, state, municipality, commission, or political subdivision of a state, governmental body, including federal, state, or local entity as applicable, any interstate body or any other legal entity.

"Regulations" means the Virginia Stormwater Management Program (VSMP) Permit Regulations, 9VAC25-870 et seq., as amended.

"Site" means the land or water area where any facility or land-disturbing activity is physically located or conducted, including adjacent land used or preserved in connection with the facility or land-disturbing activity. Areas channelward of mean low water in tidal Virginia shall not be considered part of a site.

"State" means the Commonwealth of Virginia.

"State Board" means the Virginia Water Control Board.

"State permit" means an approval to conduct a land-disturbing activity issued by the State Board in the form of a state stormwater individual permit or coverage issued under a state general permit or an approval issued by the State Board for stormwater discharges from an MS4. Under these state permits, the Commonwealth imposes and enforces requirements pursuant to the federal Clean Water Act and regulations, the Virginia Stormwater Management Act and the Regulations.

"State Water Control Law" means Chapter 3.1 (§ 62.1-44.2 et seq.) of Title 62.1 of the Code of Virginia.

"State waters" means all water, on the surface and under the ground, wholly or partially within or bordering the Commonwealth or within its jurisdiction, including wetlands.

"Stormwater" means precipitation that is discharged across the land surface or through conveyances to one or more waterways and that may include stormwater runoff, snow melt runoff, and surface runoff and drainage.

"Stormwater Board" means the body of Board of Supervisor-appointed individuals who convene to arbitrate written decisions of the Stormwater Authority administration.

"Stormwater management plan" means a document(s) containing material describing methods for complying with the requirements of section 6-6 of this chapter. An agreement in lieu of a stormwater management plan as defined in this chapter shall be considered to meet the requirements of a stormwater management plan.

"Stormwater Pollution Prevention Plan" or "SWPPP" means a document that is prepared in accordance with good engineering practices and that identifies potential sources of pollutants that may reasonably be expected to affect the quality of stormwater discharges from a construction site, and otherwise meets the requirements of this chapter. In addition, the document shall identify and require the implementation of control measures, and shall include, but not be limited to the inclusion of, or the incorporation by reference of, an approved erosion and sediment control plan, an approved stormwater management plan, and a pollution prevention plan.

"Subdivision" means the division of any lot, tract, or parcel of land into two (2) or more lots or parcels, for the purpose, whether immediate or future, of transfer of ownership, or building development.

"Total maximum daily load" or "TMDL" means the sum of the individual wasteload allocations for point sources, load allocations for nonpoint sources, natural background loading and a margin of safety.

TMDLs can be expressed in terms of either mass per time, toxicity, or other appropriate measure. The TMDL process provides for point versus nonpoint source trade-offs.

"Virginia Stormwater BMP Clearinghouse website" means a state-designated website that contains detailed design standards and specifications for control measures that may be used in Virginia to comply with the requirements of the Virginia Stormwater Management Act and associated regulations.

"Virginia Stormwater Management Act" or "Act" means Article 2.3 (§ 62.1-44.15 et seq.) of Chapter 3.1 of Title 62.1 of the Code of Virginia.

"Virginia Stormwater Management Program" or "VSMP" means a program approved by the State Board after September 13, 2011, that has been established by a locality to manage the quality and quantity of runoff resulting from land-disturbing activities and shall include such items as local ordinances, rules, permit requirements, annual standards and specifications, policies and guidelines, technical materials, and requirements for plan review, inspection, enforcement, where authorized in this article, and evaluation consistent with the requirements of Article 2.3 of Chapter 3.1 of Title 62.1 of the Code of Virginia, and associated regulations.

"Virginia Stormwater Management Program authority" or "VSMP authority" means an authority approved by the State Board after September 13, 2011, to operate a Virginia Stormwater Management Program.

(Ord. of 6-3-2014(1), § 1-2)

Sec. 6-3. - Stormwater permit requirement; exemptions.

(a) Except as provided herein, no person may engage in any land-disturbing activity until a VSMP authority permit has been issued by the Administrator in accordance with the provisions of this chapter.

(b) Chesapeake Bay Preservation Act land-disturbing activities do not require completion of a registration statement or require coverage under the general permit but shall be subject to an erosion and sediment control plan consistent with the requirements of the Erosion and Sediment Control Ordinance, a stormwater management plan as outlined under section 6-6 of this chapter, the technical criteria and administrative requirements for land-disturbing activities outlined in section 6-9 of this chapter, and the requirements for control measures long-term maintenance outlined under section 6-10 of this chapter.

(c) Notwithstanding any other provisions of this chapter, the following activities are exempt from the requirements and regulations contained in this chapter, unless otherwise required by federal law:

    (1) Permitted surface or deep mining operations and projects, or oil and gas operations and projects conducted under the provisions of Title 45.1 of the Code of Virginia;

    (2) Clearing of lands specifically for agricultural purposes and the management, tilling, planting, or harvesting of agricultural, horticultural, or forest crops, livestock feedlot operations, or as additionally set forth by the State Board in regulations, including engineering operations as follows: construction of terraces, terrace outlets, check dams, desilting basins, dikes, ponds, ditches, strip cropping, lister furrowing, contour cultivating, contour furrowing, land drainage, and land irrigation; however, this exception shall not apply to harvesting of forest crops unless the area on which harvesting occurs is reforested artificially or naturally in accordance with the provisions of Chapter 11 (§ 10.1-1100 et seq.) of Title 10.1 of the Code of Virginia or is converted to bona fide agricultural or improved pasture use as described in Virginia Code § 10.1-1163(B);

(3) Single-family residences separately built and disturbing less than one acre and not part of a larger common plan of development or sale, including additions or modifications to existing single-family detached residential structures;

(4) Land-disturbing activities that disturb less than one acre of land area, except for land-disturbing activity exceeding an area of 2,500 square feet in all areas of the county designated as subject to the Chesapeake Bay Preservation Area Designation and Management Regulations (9VAC25-830) adopted pursuant to the provisions of the Chesapeake Bay Preservation Act (Virginia Code § 62.1-44.15:67 et seq.) or activities that are part of a larger common plan of development or sale that is one acre or greater of disturbance;

(5) Permitted or authorized discharges to a sanitary sewer or a combined sewer system;

(6) Activities under a State or federal reclamation program to return an abandoned property to an agricultural or open land use;

(7) Routine maintenance that is performed to maintain the original line and grade, hydraulic capacity, or original construction of a project. The paving of an existing road with a compacted or impervious surface and reestablishment of existing associated ditches and shoulders shall be deemed routine maintenance if performed in accordance with this subsection; and

(8) Conducting land-disturbing activities in response to a public emergency where the related work requires immediate authorization to avoid imminent endangerment to human health or the environment. In such situations, the Administrator shall be advised of the disturbance within seven days of commencing the land-disturbing activity and compliance with the administrative requirements of Virginia Code § 62.1-44.15:34(A) is required within 30 days of commencing the land-disturbing activity.

(Ord. of 6-3-2014(1), § 1-3)

Sec. 6-4. - Stormwater management program established; submission and approval of plans; prohibitions.

(a) Pursuant to § 62.1-44.15:27 of the Code of Virginia, Gloucester County hereby establishes a Virginia stormwater management program for land-disturbing activities and adopts the applicable Regulations that specify standards and specifications for VSMPs promulgated by the State Board for the purposes set out in section 6-1 of this chapter. The Gloucester County Board of Supervisors hereby designates the County Administrator as the Administrator of the Virginia stormwater management program.

(b) No VSMP authority permit shall be issued by the Administrator until the following items have been submitted to, and approved by, the Administrator as prescribed herein:

(1) A permit application that includes a general permit registration statement;

(2) An erosion and sediment control plan approved in accordance with the Erosion and Sediment Control Ordinance of Gloucester County, Virginia (Chapter 7.5); and

(3) A stormwater management plan that meets the requirements of Section 6-6 of this chapter or an agreement in lieu of a stormwater management plan as determined appropriate by the Administrator.

(c) No VSMP authority permit shall be issued until evidence of general permit coverage is obtained by the Administrator from the Department.

(d) No VSMP authority permit shall be issued until the fees required to be paid pursuant to section 6-15 of this chapter are received, and a reasonable performance surety required pursuant to section 6-16 of this chapter has been submitted.

(e) No VSMP authority permit shall be issued unless and until the permit application and attendant materials and supporting documentation demonstrate that all land clearing, construction, disturbance, land development and drainage will be done according to the approved permit.

(f) No grading, building or other local permit shall be issued for a property unless a VSMP authority permit has been issued by the Administrator.

(Ord. of 6-3-2014(1), § 1-4)

Sec. 6-5. - Stormwater pollution prevention plan; contents of plans.

(a) The Stormwater Pollution Prevention Plan (SWPPP) shall include the content specified by Section 9VAC25-870-54 and must also comply with the requirements and general information set forth in Section 9VAC25-880-70, Section II [stormwater pollution prevention plan] of the general permit.

(b) The SWPPP shall be amended by the operator whenever there is a change in design, construction, operation, or maintenance that has a significant effect on the discharge of pollutants to state waters which is not addressed by the existing SWPPP.

(c) The SWPPP must be maintained by the operator at a central location onsite. If an onsite location is unavailable, notice of the SWPPP's location must be posted near the main entrance at the construction site. Operators shall make the SWPPP available for public review in accordance with Section II of the general permit, either electronically or in hard copy.

(Ord. of 6-3-2014(1), § 1-5)

Sec. 6-6. - Stormwater management plan; contents of plan.

(a) The Stormwater Management Plan, required in section 6-4 of this chapter, must apply the stormwater management technical criteria set forth in section 6-9 of this chapter to the entire land-disturbing activity. Individual lots in new residential, commercial, or industrial developments, including those developed under subsequent owners, shall not be considered separate land-disturbing activities. The Stormwater Management Plan shall consider all known sources of surface runoff and all known sources of subsurface and groundwater flows converted to surface runoff, and include the following information:

(1) Information on the type and location of stormwater discharges; information on the features to which stormwater is being discharged including surface waters or karst features, if present, and the predevelopment and post-development drainage areas;

(2) Contact information including the name, address, email address, and telephone number of the owner and the tax reference number, parcel number, and RPC of the property or properties affected;

(3) A narrative that includes a description of current site conditions and final site conditions;

(4) A general description of the proposed stormwater management facilities and the mechanism through which the facilities will be operated and maintained after construction is complete and a note that states the stormwater management meets the requirements set forth in the VSMP Permit Regulations (9VAC25-870-55) and the Administrative Guidance Manual;

(5) Information on the proposed stormwater management facilities, including:

(i) The type of facilities;

(ii) Location, including geographic coordinates;

(iii) Acres treated; and

(iv) The surface waters or karst features, if present, into which the facility will discharge.

(6) Hydrologic and hydraulic computations, including runoff characteristics;

(7) Documentation and calculations verifying compliance with the water quality and quantity requirements of section 6-9 of this chapter and the Administrative Guidance Manual; and

(8) A map or maps of the site that depicts the topography of the site and includes:

(i) All contributing drainage areas;

(ii) Existing streams, ponds, culverts, ditches, wetlands, other water bodies, and floodplains;

(iii) Soil types, geologic formations if karst features are present in the area, forest cover, and other vegetative areas;

(iv) Current land use including existing structures, roads, and locations of known utilities and easements;

(v) Sufficient information on adjoining parcels to assess the impacts of stormwater from the site on these parcels;

(vi) The limits of clearing and grading, and the proposed drainage patterns on the site;

(vii) Proposed buildings, roads, parking areas, utilities, and stormwater management facilities; and

(viii) Proposed land use with tabulation of the percentage of surface area to be adapted to various uses, including but not limited to planned locations of utilities, roads, and easements.

(b) If an operator intends to meet the water quality and/or quantity requirements set forth in section 6-9 of this chapter through the use of off-site compliance options, where applicable, then a letter of availability from the off-site provider must be included. Approved off-site options must achieve the necessary nutrient reductions prior to the commencement of the applicant's land-disturbing activity except as otherwise allowed by § 62.1-44.15:35 of the Code of Virginia.

(c) Elements of the stormwater management plans that include activities regulated under Chapter 4 (§ 54.1-400 et seq.) of Title 54.1 of the Code of Virginia shall be appropriately sealed and signed by a professional registered in the Commonwealth of Virginia pursuant to Article 1 (§ 54.1-400 et seq.) of Chapter 4 of Title 54.1 of the Code of Virginia.

(d) A construction record drawing for permanent stormwater management facilities shall be submitted to the Administrator. The construction record drawing shall be appropriately sealed and signed by a professional engineer, architect, landscape architect, or land surveyor registered in the Commonwealth of Virginia, certifying that the stormwater management facilities have been constructed in accordance with the approved plan.

(Ord. of 6-3-2014(1), § 1-6)

Sec. 6-7. - Pollution prevention plan; contents of plans.

(a) A Pollution Prevention Plan, required by 9VAC25-870-56, shall be developed, implemented, and updated as necessary and must detail the design, installation, implementation, and maintenance of effective pollution prevention measures to minimize the discharge of pollutants. At a minimum, such measures must be designed, installed, implemented, and maintained to:

(1) Minimize the discharge of pollutants from equipment and vehicle washing, wheel wash water, and other wash waters. Wash waters must be treated in a sediment basin or alternative control that provides equivalent treatment to a sediment basin or better treatment prior to discharge;

(2) Minimize the exposure of building materials, building products, construction wastes, trash, landscape materials, fertilizers, pesticides, herbicides, detergents, sanitary waste, and other materials present on the site to precipitation and to stormwater; and

(3) Minimize the discharge of pollutants from spills and leaks and implement chemical spill and leak prevention and response procedures.

(b) The pollution prevention plan shall include effective best management practices to prohibit the following discharges:

(1) Wastewater from washout of concrete, unless managed by an appropriate control;

(2) Wastewater from washout and cleanout of stucco, paint, form release oils, curing compounds, and other construction materials;

(3) Fuels, oils, or other pollutants used in vehicle and equipment operation and maintenance; and

(4) Soaps or solvents used in vehicle and equipment washing.

(c) Discharges from dewatering activities, including discharges from dewatering of trenches and excavations, are prohibited unless managed by appropriate controls.

(Ord. of 6-3-2014(1), § 1-7)

Sec. 6-8. - Review of stormwater management plan.

(a) The Administrator shall review stormwater management plans and shall approve or disapprove a stormwater management plan according to the following:

(1) The Administrator shall determine the completeness of a plan in accordance with section 6-6 of this chapter, and shall notify the applicant, in writing, of such determination, within 15 working days of receipt of VSMP permit application notification. If the plan is deemed to be incomplete, the above written notification shall contain the reasons the plan is deemed incomplete.

(2) The Administrator shall have an additional 60 calendar days from the date of the communication of completeness to review the plan, except that if a determination of completeness is not made within the time prescribed in subdivision (1), then the plan shall be deemed complete and the Administrator shall have 60 calendar days from the date of submission to review the plan.

(3) For plans not approved by the Administrator, including an incomplete submittal, all comments shall be addressed and resubmitted by the applicant within 180 calendar days of the latest plan-review comment letter addressed to the applicant. Plans that are not resubmitted within this time period may be subject to a new application fee, as outlined in the Administrative Guidance Manual or referenced as a re-submittal fee in the Fee Schedule.

(4) The Administrator shall review any plan that has been previously disapproved, within 45 calendar days of the date of resubmission.

(5) During the review period, the plan shall be approved or disapproved and the decision communicated in writing to the Applicant. If the plan is not approved, the reasons for not approving the plan shall be provided in writing to the Applicant. Approval or denial shall be based on the plan's compliance with the requirements of this chapter and the Administrative Guidance Manual.

(6) If a plan meeting all requirements of this chapter is submitted and no action is taken within the time provided above in subdivision (2) for review, the plan shall be deemed approved.

(b) Approved stormwater plans may be modified as follows:

(1) Modifications to an approved stormwater management plan shall be allowed only after review and written approval by the Administrator. The Administrator shall have 60 calendar days to respond in writing either approving or disapproving such request.

(2) The Administrator may require that an approved stormwater management plan be amended, within a time prescribed by the Administrator, to address any deficiencies noted during stormwater inspection.

(c) The operator shall submit to the Administrator construction record drawings for permanent stormwater management facilities.

(Ord. of 6-3-2014(1), § 1-8)

Sec. 6-9. - Technical criteria for regulated land-disturbing activities.

(a) To protect the quality and quantity of state water from the potential harm of unmanaged stormwater runoff resulting from land-disturbing activities, the county hereby adopts the technical criteria for regulated land-disturbing activities set forth in 9VAC25-870-62 [Part II B of the Regulations], as amended, expressly to include 9VAC25-870-63 [water quality design criteria requirements]; 9VAC25-870-65 [water quality compliance]; 9VAC25-870-66 [water quantity]; 9VAC25-870-69 [offsite compliance options]; 9VAC25-870-72 [design storms and hydrologic methods]; 9VAC25-870-74 [stormwater harvesting]; 9VAC25-870-76 [linear development projects]; 9VAC25-870-85 [stormwater management impoundment structures or facilities]; and 9VAC25-870-92 [comprehensive stormwater management plans], which shall apply to all land-disturbing activities regulated pursuant to this chapter, except as expressly set forth in subsection (b) and (c) of this section.

(b) Any land-disturbing activity shall be considered grandfathered and shall be subject to 9VAC25-870-93 thru 99 [Part II C Technical Criteria of the Regulations], provided:

(1) A proffered or conditional zoning plan, zoning with a plan of development, preliminary or final subdivision plat, preliminary or final site plan, or any document determined by the locality to be equivalent thereto (i) was approved by the locality prior to July 1, 2012, (ii) provided a layout as defined in 9VAC25-870-10, (iii) will comply with the Part II C technical criteria of the VSMP Regulations, and (iv) has not been subsequently modified or amended in a manner resulting in an increase in the amount of phosphorus leaving each point of discharge, and such that there is no increase in the volume or rate of runoff;

(2) A state permit has not been issued prior to July 1, 2014; and

(3) Land disturbance did not commence prior to July 1, 2014.

(c) County, state, and federal projects shall be considered grandfathered by the VSMP authority and shall be subject to the Part II C technical criteria of the VSMP Regulations, provided:

(1) There has been an obligation of county, state, or federal funding, in whole or in part, prior to July 1, 2012, or the department has approved a stormwater management plan prior to July 01, 2012;

(2) A state permit has not been issued prior to July 1, 2014; and

(3) Land disturbance did not commence prior to July 1, 2014.

(d) Land-disturbing activities grandfathered under subsections b and c of this section shall remain subject to the Part II C Technical Criteria of the Regulations for one additional state permit cycle. After such time, portions of the project not under construction shall become subject to any new technical criteria adopted by the State Board.

(e) In cases where governmental bonding or public debt financing has been issued for a project prior to July 01, 2012, such project shall be subject to the technical criteria of Part II C of the VSMP Regulations.

(f) The Administrator may grant exceptions to the technical requirements of Part II B or Part II C of the Regulations, provided that (i) the exception is the minimum necessary to afford relief, (ii) reasonable and appropriate conditions are imposed so that the intent of the Act, the Regulations, and this chapter are preserved, (iii) granting the exception will not confer any special privileges that are denied in other similar circumstances, and (iv) exception requests are not based upon conditions or circumstances that are self-imposed or self-created. Economic hardship alone is not a sufficient reason to grant an exception from the requirements of this chapter. Exceptions granted shall be reported to the Department.

    (1) Exceptions to the requirement that the land-disturbing activity obtain required VSMP authority permit shall not be given by the Administrator, nor shall the Administrator approve the use of a BMP not found on the Virginia Stormwater BMP Clearinghouse Website, or any other control measure duly approved by the Department.

    (2) Exceptions to requirements for phosphorus reductions shall not be allowed unless offsite options otherwise permitted pursuant to 9VAC25-870-69 have been considered and found not available.

(g) Nothing in this section shall preclude an operator from constructing to a more stringent standard at his discretion.

(Ord. of 6-3-2014(1), § 1-9)

Sec. 6-10. - Long-term maintenance of permanent stormwater facilities.

The Administrator shall require the provision of long-term responsibility for and maintenance of stormwater management facilities and other techniques specified to manage the quality and quantity of runoff. Such requirements shall be set forth in an instrument recorded in the county land records prior to general permit termination or earlier as required by the Administrator, and shall at a minimum:

(a) Be submitted to the Administrator for review and approval prior to the approval of the stormwater management plan;

(b) Be stated to run with the land;

(c) Provide for all necessary access to the property for purposes of maintenance and regulatory inspections;

(d) Provide for inspections and maintenance and the submission of inspection and maintenance reports to the Administrator; and

(e) Be enforceable by all appropriate governmental parties.

(Ord. of 6-3-2014(1), § 1-10)

Sec. 6-11. - Monitoring and inspections.

(a) Pursuant to § 62.1-44.15:37 of the Code of Virginia, the Administrator or any duly authorized agent of the Administrator shall provide for periodic inspections of a land-disturbing activity during construction for:

(1) Compliance with the approved erosion and sediment control plan;

(2) Compliance with the approved stormwater management plan;

(3) Development, updating, and implementation of a pollution prevention plan; and

(4) Development and implementation of any additional control measures necessary to address a TMDL.

(b) The Administrator or any duly authorized agent of the Administrator may, at reasonable times and under reasonable circumstances, enter any establishment or upon any property, public or private, for the purpose of obtaining information or conducting surveys or investigations necessary in the enforcement of the provisions of this chapter when reasonable notice has been provided to the owner/agent.

(c) In accordance with a performance bond with surety, cash escrow, letter of credit, any combination thereof, or such other legal arrangement or instrument, the Administrator may also enter any establishment or upon any property, public or private, for the purpose of initiating or maintaining appropriate actions which are required by the permit conditions associated with a permitted activity when a permittee, after proper notice, has failed to take acceptable action within the time specified.

(d) Pursuant to § 62.1-44.15:40 of the Code of Virginia, the Administrator may require every VSMP authority permit applicant or permittee, or any such person subject to VSMP authority requirements under this chapter, to furnish when requested such application materials, plans, specifications, and other pertinent information as may be necessary to determine the effect of his discharge on the quality of state waters, or such other information as may be necessary to accomplish the purposes of this chapter.

(e) Post-construction inspections of stormwater management facilities required by the provisions of this chapter and the recorded maintenance agreement shall be conducted by the owner and at the owner's cost pursuant to the county's adopted and Board approved inspection program, and shall occur within the minimum frequencies shown in BMP Inspection Frequency Table within the Administrative Guidance Manual following approval of the final construction record report for each stormwater facility.

(f) The owner shall furnish to the Administrator an inspection report prepared by a qualified inspector within the time frames provided in the BMP Inspection Frequency Table within the Administrative Guidance Manual. This report shall include, but not be limited to, current photographs of the BMP, a summary of the current BMP condition, and any recommendations for improvements, if necessary.

(g) Qualified inspection personnel include a professional engineer, architect, landscape architect, or land surveyor registered in the Commonwealth of Virginia and project inspector or combined administrator for stormwater authority who have met the certification requirements of Virginia Code § 62.1-44.15:30.

(h) Post-construction inspections of stormwater management facilities required by the provisions of this chapter shall be conducted by the Administrator pursuant to the County's adopted and State Board approved inspection program, and shall occur, at a minimum, at least once every five (5) years.

(Ord. of 6-3-2014(1), § 1-11)

Sec. 6-12. - Hearings.

(a) Any permit applicant or permittee, or person subject to the requirements of this chapter, aggrieved by any action of the county taken without a formal hearing, or by inaction of the county, may demand in writing a formal hearing by the Stormwater Board considering such grievance, provided a petition requesting such hearing is filed with the Administrator within 30 days after notice of such action is given by the Administrator.

(b) The hearings held under this section shall be conducted by the Stormwater Board at a time and place identified by the Stormwater Board.

(c) A verbatim record of the proceedings of such hearings shall be taken and filed with the Stormwater Board.

(Ord. of 6-3-2014(1), § 1-12)

Sec. 6-13. - Appeals.

The final decision of the county under this chapter shall be subject to review by the Circuit Court of Gloucester County, provided an appeal is filed within thirty (30) days from the date of any written decision adversely affecting the rights, duties, or privileges of the person engaging in or proposing to engage in land-disturbing activities. An appeal shall not stay the decision of the County.

(Ord. of 6-3-2014(1), § 1-13)

Sec. 6-14. - Enforcement.

(a) If the Administrator determines that there is a failure to comply with the VSMP authority permit conditions or determines there is an unauthorized discharge, notice shall be served upon the permittee or person responsible for carrying out the permit conditions by, but shall not be limited to, any of the following: verbal warnings and inspection reports, notices of violation, notices of corrective action, consent special orders, and notices to comply. Written notices shall be served by registered or certified mail to the address specified in the permit application or by delivery at the site of the development activities to the agent or employee supervising such activities.

    (1) The notice shall specify the measures needed to comply with the permit conditions and shall specify the time within which such measures shall be completed. Upon failure to comply within the time specified, a stop work order may be issued in accordance with subsection (2) or the permit may be revoked by the Administrator.

    (2) If a permittee fails to comply with a notice issued in accordance with this section within the time specified, the Administrator may issue an order requiring the owner, permittee, person responsible for carrying out an approved plan, or the person conducting the land-disturbing activities without an approved plan or required permit to cease all land-disturbing activities until the violation of the permit has ceased, or an approved plan and required permits are obtained, and specified corrective measures have been completed.

    Such orders shall be issued in accordance with the Administrative Guidance Manual. Such orders shall become effective upon service on the person by certified mail, return receipt requested, sent to his address specified in the land records of the county, or by personal delivery by an agent of the Administrator. However, if the Administrator finds that any such violation is grossly affecting or presents an imminent and substantial danger of causing harmful erosion of lands or sediment deposition in waters within the watersheds of the Commonwealth or otherwise substantially impacting water quality, she may issue, without advance notice or hearing, an emergency order directing such person to cease immediately all land-disturbing activities on the

site and shall provide an opportunity for a hearing, after reasonable notice as to the time and place thereof, to such person, to affirm, modify, amend, or cancel such emergency order. If a person who has been issued an order is not complying with the terms thereof, the Administrator may revoke the permit and institute a proceeding for an injunction, mandamus, or other appropriate remedy in accordance with subsection 6-14(c).

(b) In addition to any other remedy provided by this chapter, if the Administrator determines that there is a failure to comply with the provisions of this chapter, she may initiate such informal and/or formal administrative enforcement procedures in a manner that is consistent with the Administrative Guidance Manual.

(c) Any person violating or failing, neglecting, or refusing to obey any rule, regulation, ordinance, order, approved standard or specification, or any permit condition issued by the Administrator may be compelled in a proceeding instituted in Circuit Court of Gloucester County to obey the same and to comply therewith by injunction, mandamus or other appropriate remedy.

(d) Any person who violates any provision of this chapter or who fails, neglects, or refuses to comply with any order of the Administrator, shall be subject to a civil penalty not to exceed $32,500 for each violation. Each day of violation of each requirement shall constitute a separate offense.

(1) Violations for which a penalty may be imposed under this subsection shall include but not be limited to the following:

(i) No state permit registration;

(ii) No SWPPP;

(iii) Incomplete SWPPP;

(iv) SWPPP not available for review;

(v) No approved erosion and sediment control plan;

(vi) Failure to install stormwater BMPs or erosion and sediment controls;

(vii) Stormwater BMPs or erosion and sediment controls improperly installed or maintained;

(viii) Operational deficiencies;

(ix) Failure to conduct required inspections;

(x) Incomplete, improper, or missed inspections; and

(xi) Discharges not in compliance with the requirements of Section 9VAC25-880-70 of the general permit.

(2) The Administrator may issue a summons for collection of the civil penalty and the action may be prosecuted in the appropriate court.

(3) In imposing a civil penalty pursuant to this subsection, the court may consider the degree of harm caused by the violation and also the economic benefit to the violator from noncompliance.

(4) Any civil penalties assessed by a court as a result of a summons issued by the county shall be paid into the treasury of the county to be used for the purpose of minimizing, preventing, managing, or mitigating pollution of the waters of the county and abating environmental pollution therein in such manner as the court may, by order, direct.

(e) Notwithstanding any other civil or equitable remedy provided by this section or by law, any person who willfully or negligently violates any provision of this chapter, any order of the Administrator, any

condition of a permit, or any order of a court shall be guilty of a Class 1 misdemeanor punishable by confinement in jail for not more than 12 months, or a fine of not more than $2,500, or both.

(f) Violation of any provision of this chapter may also result in the following sanctions:

(1) The VSMP authority, where authorized to enforce Virginia Code § 62.1-44.15:24 et seq., may apply to the Circuit Court of Gloucester County to enjoin a violation or a threatened violation of the provisions of Virginia Code § 62.1-44.15:24 et seq. or of this chapter without the necessity of showing that an adequate remedy at law does not exist.

(2) With the consent of any person who has violated or failed, neglected, or refused to obey any ordinance, any condition of a permit, any order of the VSMP authority, or any provision of Virginia Code § 62.1-44.15:24 et seq., the VSMP authority may provide, in an order issued against such person, for the payment of civil charges for violations in specific sums, not to exceed the limit specified in this section. Such civil charges shall be instead of any appropriate civil penalty that could be imposed under this section. Any civil charges collected shall be paid to the treasury of the county pursuant to subsection (d)(4). Charges collected shall be applied to environmental restoration.

(Ord. of 6-3-2014(1), § 1-14)

Sec. 6-15. - Fees.

(a) Fees to cover costs associated with implementation of a VSMP related to land-disturbing activities and issuance of general permit coverage and VSMP authority permits shall be imposed in accordance with Table 1.

(b) The applicable fees designated to the Administrator shall be paid by the Applicant directly to the Administrator at the initial plan submittal; fees designated to the Department shall be paid by the Applicant directly to the Department through the online reporting system. A minimum 50-percent of the fee is required upon submittal; the difference shall be due prior to issuance of permit.

Table 1: Stormwater Ordinance Permitting Fees

Type of Permit	Fee Amount	
	County	State
Chesapeake Bay Preservation Act Land-Disturbing Activity (not subject to General Permit coverage; sites within designated areas of Chesapeake Bay Act localities with land-disturbance acreage equal to or greater than 2,500 square feet and less than 1 acre)	$290	$0
VSMP General/Stormwater Management - Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land-disturbance acreage less than one acre, except for single-family detached residential structures)	$209	$81

VSMP General/Stormwater Management - Small Construction Activity/Land Clearing (single family detached residential structure with a site or area, within or outside a common plan of development or sale, that is equal to or greater than one acre but less than five acres)	$209	$0
VSMP General/Stormwater Management - Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 1 acre and less than 5 Acres)	$1,944	$756
VSMP General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 5 acres and less than 10 acres)	$2,448	$952
VSMP General/Stormwater Management - Large Construction Activity/Land Clearing [Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 10 acres and less than 50 acres]	$3,240	$1,260
VSMP General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 50 acres and less than 100 acres)	$4,392	$1,708
VSMP General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land disturbance acreage equal to or greater than 100 acres)	$6,912	$2,688
VSMP Individual Permit for Discharges of Stormwater From Construction Activities	$0	$15,000

(c) Fees for the modification or transfer of registration statements from the general permit issued by the Board shall be imposed in accordance with VSMP Permit Regulations and adopted by this chapter in accordance with Table 2 and shall be paid directly to the Administrator.

Table 2: Fees for the modification or transfer of registration statements for the General Permit for Discharges of Stormwater from Construction Activities

Type of Permit	Fee Amount
Chesapeake Bay Preservation Act Land-Disturbing Activity (not subject to General Permit coverage; sites within designated areas of Chesapeake Bay Act localities with land-disturbance acreage equal to or greater than 2,500 square feet and less than 1 acre)	$20
General/Stormwater Management - Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land-disturbance acreage less than one acre, except for single-family detached residential structures)	$20

General/Stormwater Management - Small Construction Activity/Land Clearing (Single-family detached residential structures within or outside a common plan of development or sale with land-disturbance acreage less than 5 acres)	$20
General/Stormwater Management - Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than one and less than five acres)	$200
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than five acres and less than 10 acres)	$250
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than 10 acres and less than 50 acres)	$300
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than 50 acres and less than 100 acres)	$450
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than 100 acres)	$700
Individual Permit for Discharges of Stormwater from Construction Activities	$5,000

(d) If the general permit modifications result in changes to stormwater management plans that require additional review by the county, such reviews shall be subject to the fees set out in the VSMP Permit Regulations and this chapter.

(e) The fee assessed shall be based on the total disturbed acreage of the site. In addition to the general permit modification fee, applicants seeking modifications resulting in an increase in total disturbed acreage shall pay the difference in the initial permit fee paid and the permit fee that would have applied for the total disturbed acreage in this chapter. These fees shall be paid directly to the Administrator.

(f) Annual permit maintenance shall be imposed in accordance with Table 3 of this chapter, including fees imposed on expired permits that have been administratively continued. With respect to the general permit, these fees shall apply until the permit coverage is terminated.

Table 3: Permit Maintenance Fees

Type of Permit	Fee Amount
Chesapeake Bay Preservation Act Land-Disturbing Activity (not subject to General Permit coverage; sites within designated areas of Chesapeake Bay Act localities with land-disturbance acreage equal to or greater than 2,500 square feet and less than 1 acre)	$50
General/Stormwater Management - Small Construction Activity/Land Clearing (Areas within common plans of development or sale with land-disturbance acreage less than one acre)	$50
General/Stormwater Management - Small Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance equal to or greater than one acre and less than five acres)	$400
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than five acres and less than 10 acres)	$500
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than 10 acres and less than 50 acres)	$650
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater than 50 acres and less than 100 acres)	$900
General/Stormwater Management - Large Construction Activity/Land Clearing (Sites or areas within common plans of development or sale with land-disturbance acreage equal to or greater [than] 100 acres)	$1,400
Individual Permit for Discharges from Construction Activities	$3,000

(g) General permit coverage maintenance fees shall be paid annually to the county, by the anniversary date of general permit coverage. No permit will be reissued or automatically continued without payment of the required fee. General permit coverage maintenance fees shall be applied until a Notice of Termination is effective.

(h) The fees set forth in subsections (a) through (g) above, shall apply to:

(1) All persons seeking coverage under the general permit.

(2) All permittees who request modifications to or transfers of their existing registration statement for coverage under a general permit.

(i) No general permit application fees will be assessed to:

(1) Permittees who request minor modifications to general permits as defined in section 6-2 of this chapter. Permit modifications at the request of the permittee resulting in changes to stormwater management plans that require additional review by the Administrator shall not be exempt pursuant to this section.

(2) Permittees whose general permits are modified or amended at the initiative of the Department, excluding errors in the registration statement identified by the Administrator or errors related to the acreage of the site.

(j) All incomplete payments will be deemed as nonpayment, and the applicant shall be notified of any incomplete payments. Interest may be charged for late payments at the underpayment rate set forth in § 58.1-15 of the Code of Virginia and is calculated on a monthly basis at the applicable periodic rate. A 10% late payment fee shall be charged to any delinquent (over 90 days past due) account. The county shall be entitled to all remedies available under the Code of Virginia in collecting any past due amount.

(k) The fee for applications brought for hearing through the Stormwater Board, section 6-12 of this chapter, shall be $275.

(Ord. of 6-3-2014(1), § 1-15)

Sec. 6-16. - Performance bond.

Prior to permit issuance, the Applicant shall submit a reasonable performance bond with surety, cash escrow, letter of credit, any combination thereof, or such other legal arrangement acceptable to the county attorney and Administrator to ensure that measures could be taken by the county at the Applicant's expense should he fail, after proper notice, within the time specified to initiate or maintain appropriate actions which may be required of him by the permit conditions as a result of his land disturbing activity. If the county takes such action upon such failure by the Applicant, the county may collect from the Applicant the difference should the amount of the reasonable cost of such action exceed the amount of the security held, if any. Within 60 days of the completion of the requirements of the permit conditions, such bond, cash escrow, letter of credit or other legal arrangement, or the unexpended or unobligated portion thereof, shall be refunded to the Applicant or terminated.

(Ord. of 6-3-2014(1), § 1-16)

Appendix M –
MOU amongst Rappahannock Fire Association Participants

GVFRS

MEMORANDUM OF UNDERSTANDING AND COOPERATION

THIS AGREEMENT, made and entered into this 25th day of August 2011, by and among the rated fire and rescue departments of the Rappahannock Volunteer Fireman's Association.

WITNESSETH:

THAT, WHEREAS, the General Assembly of Virginia did enact into law act as Va. Code Section 27-1, which provides, in part, "**Whenever the necessity arises during any actual or potential emergency resulting from fire, personal injury, or other public disaster, the fire fighters or emergency medical technicians of any county, city or town may, together with all necessary equipment, lawfully go or be sent beyond the territorial limits of such county, city or town to any point within or without the Commonwealth, to assist in meeting such emergency.**"

WHEREAS, when responding to a call and while working at a fire or other emergency outside the territorial limits which it normally services, members and employees of county, municipal corporation, fire protection district, sanitary district and incorporated fire departments shall have all of the laws, ordinances, and regulations, and shall have all of the benefits and immunities from liability and exemptions including coverage under the Workmen's Compensation Laws, as they have when responding to a call and while working at a fire or other emergency inside the territorial limits normally served; and

WHEREAS, the purpose of this agreement is to provide a mechanism for each of the parties hereto, through their mutual cooperation, by which they may render aid to each other in case of conflagration, holocaust, civil disorder or natural disaster, which requires fire services beyond the existing capabilities of any party; and

WHEREAS, it is in the public interest for the parties hereto to enter into an agreement for mutual assistance in fire protection in order to increase fire defenses and to assure the community of adequate protection; and

WHEREAS, fire departments within the Rappahannock Volunteer Fireman's Association desire a mechanism to receive mutual aid assistance from and to send mutual aid assistance to other fire service agencies within the region;

NOW THEREFORE, in consideration of the mutual covenants contained herein by and among the parties hereto, it is hereby agreed as follows:

1. Upon receipt of a request for assistance, the Chief of the responding party will determine whether the request may be honored without impairing the respondent's capacity to provide fire protection within its own jurisdiction. The Chief or officer in charge of the responding party may authorize or provide such equipment, manpower and assistance to the requesting party, as he deems appropriate. The decision to respond and the degree of response shall remain in the discretion of the Chief of other officer in charge of the responding party.

2. No party to this agreement shall be bound to dispatch equipment, supplies or personnel to assist any other party, but every effort should be made to furnish such assistance and resources as are indicated so long as, in the judgment of the chief officer of that party, such dispatch would not seriously impair the fire defenses and protection of his own jurisdiction.

3. The Chief or other officer in charge of the party in whose jurisdiction the emergency exists and who requests assistance shall, in all instances, be in command of the emergency, controlling strategy, fire control tactics and direction of the operations.

4. It shall be the responsibility of the responding party to ensure that all personnel responding to the request for assistance are adequately trained. Each of the parties hereto shall be responsible for the conduct and actions of its personnel.

5. Each party to this agreement shall assume all liability and financial responsibility for death of or injury to any member of its own command responding to a request for assistance.

6. A party responding under the terms of this agreement shall not be responsible or financially liable for property damaged or destroyed at the scene of any civil disorder,

holocaust, conflagration or natural disaster due to firefighting and rescue operations, fire control tactics and strategy or other operations as may be required or ordered; said liability and responsibility shall rest solely with the party requesting such aid and within whose boundaries the property shall exist, or the incident occurs.

7. The party responding to the request for mutual aid under the terms of this agreement shall assume all liability and responsibility for damage to its own apparatus and/or equipment. The responding party shall also assume liability and responsibility for any damage caused by its apparatus or equipment while en route to or returning from a specific location.

8. The party who requests mutual aid shall in no way be deemed liable or responsible for the personal property of the members of the responding party which may be lost, stolen or damaged while they are performing their duties under the response terms herein.

9. Each party to this agreement shall assume all costs of salaries, wages, bonuses or other compensation for its own personnel responding for duty under the terms of this agreement and shall assume all costs of the responding party's apparatus, equipment, and supplies used in the response. The responding party shall make no charge for such use to the party requesting assistance except for any special chemicals or supplies by the responding party. Such chemicals shall be paid for by the party requesting aid upon receipt of an itemized statement of costs.

10. Any party may, at any time, terminate this agreement upon thirty-day written notice to all signatories within the agreement. Written notice shall be sent by registered mail to each department.

11. When fire department personnel are sent to another jurisdiction pursuant to this agreement, all rights, privileges and immunities as employees or agents of the responding party, including Workmen's Compensation insurance coverage, shall be extended to include their activities when acting within the scope of this agreement.

12. If a party to this agreement does not attempt to send requested assistance aid, with the provision that such aid would not seriously impact the party's own fire protection needs, it should not request or expect to receive assistance from other parties to this agreement.

13. The parties to this mutual aid agreement may amend or alter the agreement by written amendment, signed by each of the Fire Chief of all parties involved.

14. This mutual aid agreement shall remain in force for an initial term of five years, and may be extended by authorization of the governing board of any party.

THEREFORE, the governing boards of each agency agree to this regional mutual aid agreement and cause this instrument to be signed and adopted by their duly authorized officers.

Walkerton V. F. D.

Chief Herb Austin
Abingdon Volunteer Fire and Rescue, Inc.

Chief J.D. Clements
Gloucester Volunteer Fire and Rescue

Chief ~~Jimmy Brand~~ DAVID B. WOOLARD
Callao Volunteer Fire Department

King William Volunteer Fire Department
Skip Hardesty

Chief Jimmy Walden
Lower Middlesex Volunteer Fire Department

Chief Ricky Thompson
Mathews Volunteer Fire Department

Quinton Volunteer Fire Department
David R. Pitts Jr.

~~Chief Paul Richardson~~
Tappahannock Volunteer Fire Department
Deputy chief Ronnie Thomas

Chief
Upper Middlesex Volunteer Fire Department

Chief ~~Guy Williams~~ Robert W. Wilson
West Point Volunteer Fire and Rescue

Fairfields V.F.D
Phillip Keyser Chief

Whitestone V.F.D.

Chief Wayne South
Central King and Queen Volunteer Fire Department

Chief Tommy Lewis Greg Hicks President
Cople District Volunteer Fire Department

Chief Benny Balderson Benny Balderson Sign
Kilmarnock Volunteer Fire Department

Chief Jeff Calhoun
Lower King and Queen Volunteer Fire Department

Luke Heller
Chief ~~Les Cosby~~ Sign C. Ricie Crabtree Pres.
Mangohick Volunteer Fire Department

Chief Bill Thrift
Middlesex Volunteer Fire Department

Chief Brian Davis
Richmond County Volunteer Fire Department

Chief Eddie Weston
Westmoreland Volunteer Fire Department

J.D. Akers Sr.
Chief ~~Lindsey Beckham~~ James D. Akers Sr
Upper Lancaster Volunteer Fire Department

Hartfield V.F.D.
David Milby

Appendix N –
Adoption Resolutions for Localities and Tribes

PROPOSED RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN 2021 UPDATE

WHEREAS, the County of Essex, Virginia has experienced severe damage from a host of hazards such as communicable diseases, winter storm snow and ice, flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the County of Essex, Virginia will submit yearly progress reviews and plan discussion to state and FEMA, and

WHEREAS, MPPDC has executed the contract with Dewberry to run HAZUS, which is a risk modeling software to assess the region's risk from flooding, hurricane winds, and sea level rise. Based on discussions with the LPT there will be two sea level rise scenarios assessed: (1) the baseline of Mean High Water (MHHW) and (2) projected sea level rise elevation of the 2060 intermediate-high scenario of MHHW plus 3.02 feet; and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the County of Essex, Virginia, and

WHEREAS, the Plan update was reviewed at a meeting of the County of Essex, Virginia's Board of Supervisors held on April 12, 2022, as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the County of Essex, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan 2021 update is hereby adopted as the official Plan for the County of Essex, Virginia.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the County of Essex, Virginia Board of Supervisors.

3. The County Administrator/Town Administrator/Chief of the County of Essex, Virginia's Board of Supervisors will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.
4. Obtain the latest version of the FEMA: Region 3 High Hazard Potential Dams State and Local Mitigation Planning Tips Resource from FEMA Region 3 and/or State staff and use it to inform the development of the next plan update or amendment.

Adopted the 12th day of April 2022.

CERTIFICATION OF ADOPTION RESOLUTION

The undersigned Clerk of the Board of Supervisors of the County of Essex, Virginia certified that the Resolution set forth above was duly adopted during an open public meeting on the 12th day of April 2022 by a majority of the members of the Essex County Board of Supervisors with the following votes:

AYE: Gill, Johnson, Magruder, Smith

NAY: N/A

ABSTENTION: Akers

ABSENT: N/A

Signed this 12th day of April 2022.

ATTEST:

Michael A. Lombardo

Michael A. Lombardo, Clerk
Board of Supervisors of the County of Essex, Virginia

Town Manager
Eric Pollitt

Town Treasurer
Faye D. Johnson

Town Clerk
Patsy K. Scates

Chief of Police
James G. Ashworth Jr.

Town Attorney
Diane M. Lank

TOWN OF TAPPAHANNOCK

P. O. Box 266
Tappahannock, Virginia 22560
(804) 443-3336 Fax (804) 443-1051
www.tappahannock-va.gov

RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the Town of Tappahannock of Virginia has experienced severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes, and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the Town of Tappahannock and

WHEREAS, the Plan update was reviewed at a meeting of the Tappahannock Town Council held on May 9, 2022, as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the Town of Tappahannock Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the Town of Tappahannock.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the Tappahannock Town Council.
3. The Town Manager for the Town of Tappahannock will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Adopted the 9h day of May 2022.
Resolution – Middle Peninsula Hazards Mitigation Plan 2022

CERTIFICATION

I hereby certify that the foregoing was duly adopted at a regular meeting of the Town Council of the Town of Tappahannock held on the 9th day of May 2022 with a majority of the Town Council present and voting.

Patsy K. Scates

Patsy K. Scates, Town Clerk

AT A REGULAR MEETING OF THE GLOUCESTER COUNTY BOARD OF SUPERVISORS, HELD ON TUESDAY, APRIL 19, 2022, AT 7:00 P.M., IN THE COLONIAL COURTHOUSE AT 6504 MAIN STREET, GLOUCESTER, VIRGINIA ON A MOTION MADE BY MR. HUTSON, AND SECONDED BY MR. CHRISCOE, THE FOLLOWING RESOLUTION WAS ADOPTED BY THE FOLLOWING VOTE:

Phillip N. Bazzani, yes;
Ashley C. Chriscoe, yes;
Kenneth W. Gibson, yes;
Michael W. Hedrick, yes;
Christopher A. Hutson, yes;
Robert J. Orth, yes;
Kevin M. Smith, yes;

MIDDLE PENINSULA ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, Gloucester County has experienced severe damage from a host of natural hazards such as flooding from hurricanes and nor'easters, wildfires, winter storms, tornados, and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships as well as threats to public health and safety for all community residents; and

WHEREAS, the first Middle Peninsula Natural Hazards Mitigation Plan (the Plan) was undertaken as a regional planning project with nine jurisdictions participating in its development and adoption in 2006, 2011, and 2016; and

WHEREAS, all nine Middle Peninsula jurisdictions and federally recognized Tribes in the region actively participated in the update of the Plan to become the Middle Peninsula Regional All Hazards Mitigation Plan within the Federal Emergency Management Agency's required 5-year period; and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of natural hazards that face Gloucester County; and

WHEREAS, the Plan update was reviewed at a meeting of the Gloucester County Board of Supervisors held on April 19, 2022, as required by law.

NOW, THEREFORE, BE IT RESOLVED, by Gloucester County, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan Update is hereby adopted as the official Plan for Gloucester County.

2. The respective officials/staff identified in the implementation section of the Plan update are hereby directed to implement the recommended strategies assigned to them, with these officials/staff reporting on their activities, accomplishments, and progress to the Board of Supervisors on a quarterly basis.
3. The Gloucester County Emergency Management Coordinator will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

A Copy Teste:

Carol E. Steele, Acting County Administrator

King and Queen County

Founded 1691 in Virginia

Office of the County Administrator
P.O. Box 177 • King and Queen Court House, Virginia 23085
Phone: (804) 785-5975 – Fax: (804) 785-5999

RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the King and Queen County of Virginia has experience severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the King and Queen County, and

WHEREAS, the Plan update was reviewed at a meeting of the King and Queen County Board of Supervisors held on May 9, 2022 as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the King and Queen County, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the King and Queen County.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the King and Queen County Board of Supervisors.

3. The County Administrator of King and Queen County will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Adopted the 9th day of May, 2022

Tina R Ammons, Deputy Clerk

County of King William, Virginia

Board of Supervisors

RESOLUTION 22-42
RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN

WHEREAS, the County of King William, Virginia has experienced severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes, and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016; and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the Plan within the Federal Emergency Management Agency's required 5-year period; and

WHEREAS, the Plan update recommends many mitigation strategies that will help protect the residents and their property from the adverse effects of hazards that face King William County; and

WHEREAS, the Plan update was reviewed at a meeting of the King William County Board of Supervisors held on May 9, 2022, as required by law;

NOW, THEREFORE, BE IT RESOLVED by the Board of Supervisors of King William County, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the County of King William, Virginia; and

2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the King William County Board of Supervisors; and

3. The County Administrator and Board of Supervisors will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

DONE this 23rd day of May, 2022.

The vote on the foregoing was as follows:

Supervisor, 1st District: William L. Hodges – Vice Chair	Aye
Supervisor, 4th District: C. Stewart Garber, Jr.	Aye
Supervisor, 2nd District: Travis J. Moskalski	Aye
Supervisor, 3rd District: Stephen K. Greenwood	Aye
Supervisor, 5th District: Edwin H. Moren, Jr. – Chairman	Aye

ATTEST:

Edwin H. Moren, Jr., Chairman
King William County Board of Supervisors

Christine H. Branch
Deputy Clerk to the Board of Supervisors

RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the Town of West Point of Virginia has experienced severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the Town of West Point, and

WHEREAS, the Plan update was reviewed at a meeting of the West Point Town Council held on April 25, 2022 as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the Town of West Point, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the Town of West Point.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the West Point Town Council.
3. The Town Manager will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Certified to be a true copy of a resolution adopted by the Town Council of the Town of West Point at its regular monthly meeting held on the 25th day of April 2022, at which meeting a quorum was present and voting throughout.

James H. Hudson, III
Mayor

ATTEST:

Karen M. Barrow
Town Clerk

Middlesex County
Board of Supervisors

RESOLUTION
R-2022-002

At a meeting of the Middlesex County Board of Supervisors held on May 3, 2022 at 3:00 p.m.: On a motion duly made by Supervisor Jessie, and seconded by Supervisor Koontz, the following Resolution was adopted by the following vote:

Wayne H. Jessie, Sr.	Aye
Don R. Harris	Aye
John B. Koontz, Jr.	Aye
Lud H. Kimbrough, III	Aye
Reginald A. Williams, Sr.	Aye

A RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, Middlesex County, Virginia has experience severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face Middlesex County, Virginia, and

WHEREAS, the Plan update was reviewed at a meeting of the Middlesex County Board of Supervisors held on May 3, 2022, as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the Middlesex County Board of Supervisors, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the Middlesex County, Virginia.

2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the Middlesex County Board of Supervisors.

3. The County Administrator of the Middlesex County Board of Supervisors will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Adopted the 3rd day of May, 2022

A Copy Teste:

_____

Matt Walker, County Administrator

RESOLUTION

RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the Town of Urbanna, Virginia has experienced severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and 2022, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the {Locality/Tribe], and

WHEREAS, the Plan update was reviewed and voted to approve at a meeting of the Town of Urbanna Town Council held on Thursday, May 14, 2022 as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the Town of Urbanna, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the Town of Urbanna, VA.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the Urbanna Town Council.
3. The Town Administrator of Urbanna will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Adopted the 14th day of May, 2022

A Copy Teste:

Martha J. Rodenburg
Town Clerk

RESOLUTION TO ADOPT THE MIDDLE PENINSULA REGIONAL ALL HAZARDS MITIGATION PLAN UPDATE

WHEREAS, the County of Mathews of Virginia has experience severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes, and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, and 2016, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the "the Plan" within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the County of Mathews, and

WHEREAS, the Plan update was reviewed at a meeting of the County of Mathews Board of Supervisors held on April 26, 2022 as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the County of Mathews, Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the County of Mathews.
2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to the County of Mathews Board of Supervisors.
3. The County Administrator of the County of Mathews Board of Supervisors will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

Adopted the 26th day of April, 2022
ATTEST:

Judi Green, Deputy Clerk to the Board

Paul Hudgins, Chair
RECORDED VOTE:
___ Ms. Ingram
___ Rev. Dr. Mason
___ Mr. Jones
___ Mr. Walls
___ Mr. Hudgins

PAMUNKEY TRIBAL GOVERNMENT
1054 POCAHONTAS TRAIL
PAMUNKEY INDIAN RESERVATION
KING WILLIAM, VA 23086

2022-RES-003
RESOLUTION TO ADOPT THE MIDDLE PENINSULA ALL HAZARDS MITIGATION PLAN

WHEREAS, This Resolution (this "Resolution") is being adopted by the Chief and Tribal Council (the "Tribal Council"), the governing body of the Pamunkey Indian Tribe (the "Tribe") as referred to in the Laws of the Pamunkey Indians (the "Laws"); and

WHEREAS, Pursuant to Article II of the Laws, the affairs of the Tribe shall be administered and directed by a Chief and Tribal Council, which includes the power to administer the affairs and government of the Tribe, and Article VII of the Laws the Chief and Council have the authority to adopt an ordinance; and

WHEREAS, Pursuant to Ordinance LVII, Section M, the Chief and Council have the authority to adopt, rescind and modify ordinances. Such action should include a resolution. Except in emergency situations, such action requires a minimum 15-day announcement satisfied by either public posting, announcement at tribal meeting or direct mail or distribution to resident tribal members;

WHEREAS, The Tribe is committed to the safety and well-being of Tribal citizens living on the Pamunkey Indian Reservation; and

WHEREAS, tHE Middle Peninsula All Hazards Mitigation Plan that has been adopted and approved by the Federal Emergency Management Agency (FEMA) on April 12, 2022 that covers the geographic area of the Pamunkey Indian Reservation; and

WHEREAS, The Tribe has worked in coordination with Virginia Department of Emergency Management to develop a portion of this plan that affects the Pamunkey Indian Tribe and the Pamunkey Indian Reservation;

NOW, THEREFORE, BE IT RESOLVED: The Tribal Council hereby indicates its adoption of the Middle Peninsula All Hazards Mitigation Plan.

CERTIFICATION

We, the undersigned, do hereby certify that the Pamunkey Indian Tribal Chief and Tribal Council, which is composed of eight (8) members, certify that the foregoing Resolution was adopted on Sept, 2022 by the affirmative vote of 5 Council persons for, 0 Council persons against, and 0 Council persons abstaining.

Robert Gray, CHIEF
Pamunkey Indian Tribal Council

Frederick Timothy "Tim" Langston,
ASSISTANT CHIEF
Pamunkey Indian Tribal Council

Gordon Atkinson, COUNCILOR
Pamunkey Indian Tribal Council

Walter Hill Jr., COUNCILOR
Pamunkey Indian Tribal Council

Terry Langston, COUNCILOR
Pamunkey Indian Tribal Council

Debra Martin, COUNCILOR
Pamunkey Indian Tribal Council

Ashley Spivey, COUNCILOR
Pamunkey Indian Tribal Council

Wendy Roberson, COUNCILOR
Pamunkey Indian Tribal Council

RAPPAHANNOCK TRIBE

Tribal Government Offices
5036 Indian Neck Rd.
Indian Neck, VA 23148
Phone: 804-769-0260
Fax 804-769-9250
E-mail: rappahannocktribe@aol.com

To Approve & Adopt the Middle Peninsula Planning District Commission Regional All Hazard Mitigation Plan 2021

Rappahannock Tribe Resolution Number 2022 - 009

WHEREAS, The Rappahannock Tribe is a Federally Recognized and Acknowledged Tribe, possessing the inherent sovereign powers of a Tribal Government; and

WHEREAS, pursuant to Resolution 2018-04, Constitution and By-Laws of the Rappahannock Tribe ("Tribal Council") is the governing body of the Tribe, and

WHEREAS, The Tribal Government recognizes the Articles of Incorporation of Rappahannock Tribe, Inc. and certifies the members of the Rappahannock Tribe, Inc of eighteen years or more, do hereby associate as a Corporation, not for profit by virtue of the provision of Chapter Two of Title 13.1 of the code of Virginia and to that is set forth in the Articles of Incorporation; and

WHEREAS, The area covered by the Middle Peninsula Planning District Commission Regional All Hazard Mitigation Plan 2021 includes Essex, Gloucester, King William, King & Queen, Mathews, and Middlesex Counties and the Towns of West Point, Urbanna and Tappahannock and the three federally recognized Tribes, including the Pamunkey Tribe, Rappahannock Tribe and the Upper Mattaponi Tribe of the Middle Peninsula. As part of the mitigation planning requirement of the Disaster Mitigation Act of 2000 (DMA 2000), localities and tribes worked to identify, assess, and mitigate risks within their communities to ensure that critical services would continue to function if a disaster were to occur; and

WHEREAS, The Rappahannock Tribe has experienced severe damage from natural hazards such as flooding, wind damage, winter storms, and lightning on many occasions in the past as well as threats to public health and safety for all community residents: and

WHEREAS, All nine Middle Peninsula jurisdictions and federally recognized Tribes in the region actively participated in the update of the Plan to become the Middle Peninsula Planning District Commission Regional All Hazard Mitigation Plan 2021 within the Federal Emergency Management Agency's required 5-year period; and

WHEREAS, The Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of natural hazards that face the counties community areas.

NOW, THEREFORE, BE IT RESOLVED that the Rappahannock Tribal Council agreed to approve and adopt the Middle Peninsula Planning District Commission All Hazard Mitigation Plan 2021.

The Tribal Council of Rappahannock Tribe does hereby certify that the forgoing resolution was adopted and approved at a duly called meeting of the Tribal Council on this 16th day of July 2022, by consensus.

Anne Richardson, Chief — Date: July 11, 2022

RESOLUTION OF THE TRIBAL GOVERNMENT OF THE UPPER MATTAPONI INDIAN TRIBE

To Adopt the Middle Peninsula Regional All Hazards Mitigation Plan Updated 2022

Resolution Number 2022-___

WHEREAS, the Upper Mattaponi Indian Tribe of Virginia, has experience severe damage from a host of hazards such as flooding from hurricanes, nor'easters, wildfires, winter storms, tornadoes and lightning on many occasions in the past century that have resulted in property losses, loss of life, economic hardships, and threats to public health and safety for all community residents, and

WHEREAS, the first Middle Peninsula Regional All Hazards Mitigation Plan ("the Plan") was undertaken as a regional planning project with all nine (9) jurisdictions participating in its development and adoption in 2006, 2011, 2016, and 2022, and

WHEREAS, all nine (9) Middle Peninsula jurisdictions and federally recognized Tribes in the region participated in the update of the AHMP within the Federal Emergency Management Agency's required 5-year period, and

WHEREAS, the Plan update recommends many mitigation strategies that will help to protect the residents and their property from the adverse effects of hazards that face the Upper Mattaponi Indian Tribe, and

WHEREAS, the Plan update was reviewed at a meeting of the Upper Mattaponi Indian Tribe Council held on 29 June 2022 as required by law.

NOW, THEREFORE, BE IT RESOLVED, by the Upper Mattaponi Indian Tribe of Virginia, that:

1. The Middle Peninsula Regional All Hazards Mitigation Plan update is hereby adopted as the official Plan for the Upper Mattaponi Indian Tribe.

2. The respective officials/staff identified in the implementation section of the Plan update are encouraged to implement the mitigation strategies and report on their activities, accomplishments, and progress to Upper Mattaponi Indian Tribe Council.
3. The Emergency Manager of the Upper Mattaponi Indian will report status updates on mitigation strategies to the Middle Peninsula Planning District Commission and the Federal Emergency Management Agency on an annual basis.

VOTING AND CERTIFICATION

This resolution was read and considered by the Tribal Council on behalf of the Tribe with 5 voting in favor, 0 voting against, and 1 abstention.

W. Ford Adams, Chief

ATTEST

The foregoing resolution was presented and votes cast as indicated on the 29th day of June in the year 2022 by the duly elected government of the Upper Mattaponi Indian Tribe with a quorum present and voting.

Carol Ann Adams, Tribal Secretary

Appendix O -
Pamunkey Tribe Addendum

PAMUNKEY TRIBE HAZARD MITIGATION PLAN
ADDENDUM TO MIDDLE PENNINSULA ALL HAZARDS MITIGATION PLAN

Chief Robert Gray
Tribal Administrator,
Pamunkey Indian Tribe

Contents

Vision and Value Statements

The Tribe promotes the general welfare of its members by establishing duties, responsibilities and procedures for the conduct of domestic and external affairs.

All Hazard Mitigation Vision

The Tribe will strive to work with surrounding communities and local emergency responders to create an active and results-oriented all hazard mitigation plan that will make the reservation, its residents and visitors a safer and more sustainable place.

Note Concerning Sacred Sites

"The land within the Tribe's jurisdiction and surrounding areas may contain natural and cultural resources and historic property of significance to the Tribe's culture, history and values, including burial grounds and other sacred sites. The Tribe intends by this action to fully incorporate Sacred Sites into its disaster and emergency preparedness, mitigation and response plans and procedures by reference while addressing the needs and values of its community.

The entire Pamunkey Indian Reservation is listed on the National Register of Historic Places as an Archaeological District. Sacred sites of public knowledge include a cemetery behind the Pamunkey Indian Baptist Church and a site known as Powhatan's Mound. We do not wish to disclose any other site.

Background: Federal Trust Lands

The U.S. government has a trust responsibility to act as a protectorate for American Indian Tribal governments. This trust responsibility was an underlying promise made by the United States through treaties and agreements with Indian tribes. The U.S. government acquired virtually all of its land through treaties or agreements with Indian tribes. Today, most lands that Indian tribes use are owned by the United States and held in trust by the U.S. government for those tribes. The U.S. government promised that if Indian tribes would accept the limited jurisdiction of the United States, it would then extend a protectorate status to tribal governments. The U. S. Supreme Court affirmed the U.S. government's trust responsibility to American Indians in the 1830s. The court ruled that when the government entered into treaties with Indian tribes, it made a promise to protect and enhance Indian tribes.

The U.S. government assumes a trust responsibility for all lands that it owns, whether they are national parks, national forests, military reserves or Indian trust lands. The government's responsibility is to manage those lands in a way that best serves the people who use them. The United States is responsible for ensuring decisions affecting Indian trust land will benefit the tribes involved. In recent years, the United States has said that every federal agency has an obligation to ensure the protection of tribal governments, even though the trust relationship is administered primarily through the Bureau of Indian Affairs.

At this time the Pamunkey Indian Reservation is NOT federal trust land but is considered by the Commonwealth of Virginia to be state trust land. The Pamunkey Tribe does intend to request the land be taken into federal trust at a later date.

Tribal Government Structure

Indian tribes have sovereign powers over their members and their territories. These powers derive from their status as sovereign nations that existed before the formation of the United States. These powers also derive from treaties with the United States and acts of Congress.

The purpose of the tribal government of the Tribe is to promote the general welfare of its citizens by establishing duties, responsibilities and procedures for the conduct of domestic and external affairs.

Pamunkey Tribe Community Profile

This section was reviewed by Chief Robert Gray. The Community Profile provides a broad overview of the Tribe's physical, geopolitical, historical, cultural and socioeconomic characteristics, based on the most currently available information.

The coordinated use and implementation of these combined documents form a sound basis for all hazard mitigation projects, plans and activities and ensure that they are tied to the King William County's land use and environmental regulations.

General Overview

The Pamunkey Indian Reservation is a Native American reservation located in King William, Virginia, United States. The reservation lies along the Pamunkey River in King William County, Virginia on the Middle Peninsula. The Pamunkey Reservation contains approximately 1,200 acres (4.8 km²) of land, 500 acres (2 km²) of which is wetlands with numerous creeks. Forty-Three families reside on the reservation and many Tribal members live in nearby Richmond, Newport News, and other parts of Virginia.

The Pamunkey Indian Tribe is one of eleven Virginia Indian tribes recognized by the Commonwealth of Virginia, and the state's first federally recognized tribe, receiving its status in January 2016. The historical tribe was part of the Powhatan paramountcy, made up of Algonquian-speaking tribes. The Powhatan paramount chiefdom was made up of over 30 tribes, estimated to total about 10,000–15,000 people at the time the English arrived in 1607. The Pamunkey tribe made up about one-tenth to one-fifteenth of the total, as they numbered about 1,000 persons in 1607. When the English arrived, the Pamunkey were one of the most powerful groups of the Powhatan chiefdom. They inhabited the coastal tidewater of Virginia on the north side of the James River near Chesapeake Bay.

The Pamunkey tribe is one of only two that still retain reservation lands assigned by the 1646 and 1677 treaties with the English colonial government. The Pamunkey reservation is located on some of its ancestral land on the Pamunkey River adjacent to present-day King William County, Virginia. The Pamunkey tribe maintains its own laws and its own governing body, which consists of a chief and seven council members. The reservation was confirmed to the Pamunkey tribe as early as 1658 by the Governor, the Council, and the General Assembly of Virginia. The treaty of 1677 between the King of England, acting through the Governor of Virginia, and several Native American tribes including the Pamunkey is the most important existing document describing Virginia's relationship towards Indian land.

Reservation Boundaries

The reservation boundary begins at the railroad crossing on Rte 673, Pocahontas Trail and ends at the Pamunkey River.

Physical Characteristics

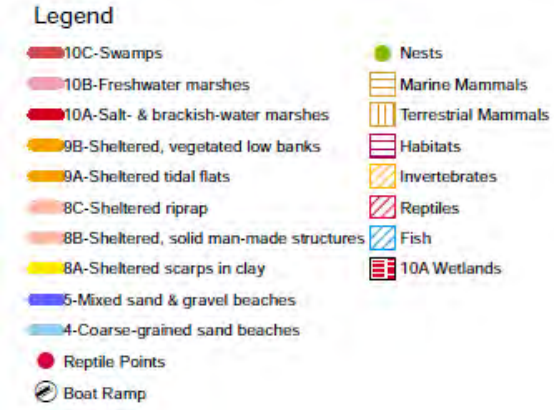
As the Pamunkey Reservation is located in the Virginia coastal plain, it has a relatively flat topography.

Primary Transportation Connections

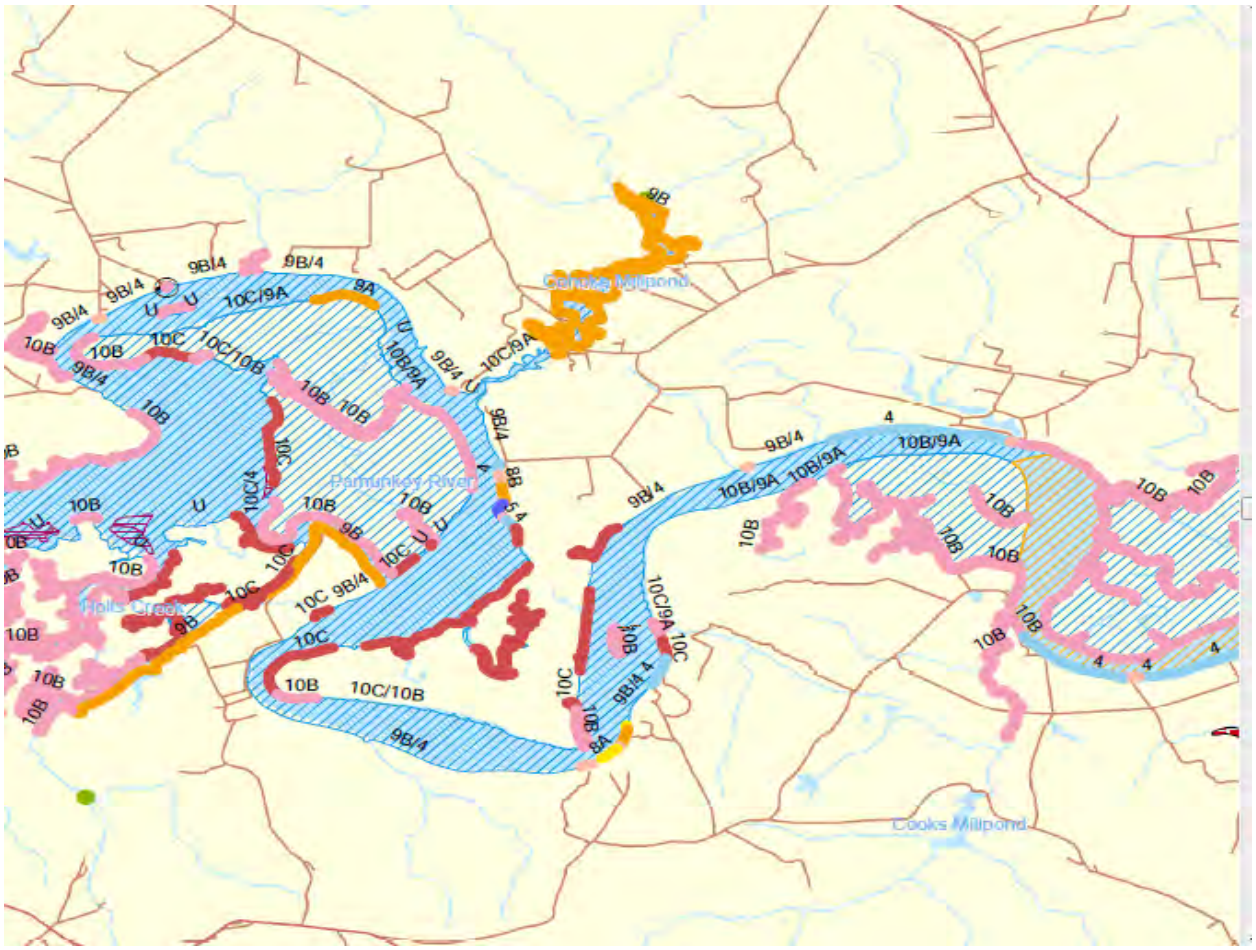
Ingress and egress to the reservation is solely via Rte 673, Pocahontas Trail which requires crossing a railroad track and, immediately adjacent, a low area that has flooded at times. Access to Rte 673 is solely via Rte 633, Powhatan Trail which extends for approximately one mile from the end of Rte 673 before branching off to any other access road.

Land Use

The Pamunkey Tribe's land use consists of recreation-based activities, limited agriculture, a fish hatchery and historic, cultural sites with a museum.



Pamunkey Indian Tribe Virginia Area Contingency Plan (Guide 58)



Climate

Climate Average Precipitation and Snowfall

At the West Point station in King William County, snow cover data was collected for 44 years between 1953 and 1997. Based on snowfall frequency and accumulation during this period, a general risk of snow cover and snow depth in a given year was calculated. Rayburn and Lozier determined that there is a 50% risk of having between 1 and 8 inches of snow on the ground for 8 days or more. This means that, in one year out of two, the Pamunkey Indian reservation will probably have snow of up to 8 inches on the ground for 8 days.

In one year out of 4, the Pamunkey Indian reservation may have snow cover up to 8 inches deep for 15 days (in other words, there is a 25% chance of having snow for 15 days).

In one year out of ten, the Pamunkey Indian reservation may have up to 8 inches of snow for 19 days (there is a 10% chance of having snow for 19 days). For deeper accumulations (greater than 8 inches), the risk is the same. There is a 10% risk of having snow cover for 2 days or more. This means that, in 1 year out of 10, this location probably will have snow cover of at least 8 inches for 2 days. The average annual snowfall for 2014 at the Pamunkey Indian reservation was 10.1 inches.

Compared to western, northern, and mountainous regions of the state, the risk of high snow accumulations in the Middle Peninsula is low and will vary amongst localities. According to the National Climactic Data Center, mean annual snowfall in the Middle Peninsula ranges from between 6 and 12 inches at the lower reaches of the region (primarily in Gloucester and Mathews Counties) to as much as 12 to 24 inches in the upper reaches of the region (primarily in Essex, King and Queen, King William, and Middlesex Counties). The proximity of adjacent water bodies bordering the region (Chesapeake Bay and its tributaries) to the Atlantic Ocean allows the Bay to retain heat and buffer to the region from intense snow. The amount of snow that falls across the watershed varies both from year to year and from location to location.

Hydrology

Based on the regions low topography, 1200+ miles of coastline, and its proximity to waterways-broad rivers, meandering creeks, wide bays and tidal marshes, the Pamunkey Reservation is highly susceptible to floods and coastal storms. Tidal surges associated with these severe storms often compound the flooding within this region.

Community Infrastructure

Critical Structure Survey

Infrastructure Name	*Address1*	City	State	Zip	Phone
Museum& Cultural Center	175 Lay Landing Road	King William	VA	23086	(804) 339-1629
Fish Hatchery	759 Lay Landing Rd	King William	VA	23086	(804) 339-1629
Pottery School	191 Lay Landing Rd	King William	VA	23086	(804) 339-1629
School House	191 Lay Landing Rd	King William	VA	23086	(804) 339-1629
Church	1446 Spring Creek Rd	King William	VA	23086	(804) 339-1629
Tribal Office	1054 Pocahontas Trail	King William	VA	23086	(804) 339-1629
Tribal Resource Center	1084 Pocahontas Trail	King William	VA	23086	(804) 339-1629

Sacred Sites

The land within the Tribe's jurisdiction and surrounding areas may contain natural and cultural resources and historic property of significance to the Tribe's culture, history and values, including burial grounds and other sacred sites.

Railroads and Waterways

The railroad borders the northern part of the reservation with a railroad crossing on Rte 673 (Pocahontas Trail). The Pamunkey River borders the southern part of the reservation.

Emergency Response Capabilities

The Tribe employs a full time, Emergency Management Coordinator. The Emergency Management Coordinator has been active participants in county, regional, tabletop, functional and full scale exercises. The Tribe routinely conducts similar exercises internally to ensure unified command skills and responsibilities from mobilization to demobilization are maintained.

Police and Conservation Officers

Law Enforcement is provided King William County because the Pamunkey Indian Reservation is currently state trust land. When the land transfers to federal trust, the Pamunkey Tribe may choose to provide law enforcement or enter into a compact with the Commonwealth and/or King William County.

Fire Services

Provided by the King William County Fire and EMS. King William County is responsible for fire protection on state forest and park land. Because the Pamunkey Indian Reservation is currently state trust land, the County is responsible for fire protection. When the land transfers to federal trust, the Pamunkey Tribe may choose to provide fire protection or enter into a compact with King William County.

Risk Assessment: Hazards Facing the Reservation

The probability of future occurrence for each hazard is identified in the risk assessment conclusions portion of each hazard analysis. Overall risk was determined by Pamunkey Tribe assessments of hazard areas, hazard impacts, and probability of occurrence.

Natural Hazards

1 Violent Storms

A Winter Storms

- Blizzards, Heavy Snows
- Ice Storms, Sleet

B Summer Storms

- Tornadoes, Straight-line Winds
- Thunderstorms, Hail, Lightning,

2 Flood
3 Extreme Temperatures
4 Drought

Other Hazards

1 Structural Fire
2 Hazardous Materials

Natural Hazards

The future probability of some identified hazards is difficult to ascertain given the lack of data available to perform such an analysis. Prior to the next plan update, needed data on events and their impacts to improve future analysis will be researched and completed.

Hazard: Violent Storms (1).

Summer Storms include straight line wind events and are a clearly defined natural hazard that can unexpectedly cause downed trees, power outages, etc. These storms are specific to the warmer months and are clearly different and separate from other storm events.

Tornadoes

The National Weather Service (NWS) defines a tornado as a violently rotating column of air in contact with the ground and extending from the base of a thunderstorm. A condensation funnel does not need to reach to the ground for a tornado to be present; however a debris cloud beneath a thunderstorm is all that is needed to confirm the presence of a tornado, even without a condensation funnel.

Tornadoes are distinguishable from waterspouts, which are small, relatively weak rotating columns of air over water beneath a cumulonimbus or towering cumulus cloud. Waterspouts are most common over tropical or subtropical waters. The exact definition of waterspout is debatable. In most cases the term is reserved for small vortices over water that are not associated with storm-scale rotation (i.e., they are the water-based equivalent of land spouts). Yet there is sufficient justification for calling virtually any rotating column of air a waterspout if it is in contact with a water surface. Between 1950 and 2014, twelve tornadoes were reported in Gloucester County, seven in Middlesex, seven in Mathews, six in King and Queen County, two in Essex County, and seven in King William County (NCDC Storm Event Database, 2015).

Tornado Vulnerability

Weak tornadoes may break branches or damage signs. Damage to buildings (ie. mobile homes or weak structures) primarily affects roofs and windows, and may include loss of the entire roof or just part of the roof covering and sheathing. Windows are usually broken from windborne debris.

In a strong tornado, some buildings may be destroyed but most suffer damage like loss of exterior walls or roof or both; interior walls usually survive. Violent tornadoes cause severe to incredible damage, including heavy cars lifted off the ground and thrown and strong frame houses leveled off foundations and swept away; trees are uprooted, debarked and splintered.

Probability

The probability of a Tornado is difficult to ascertain given the lack of data available to perform such an analysis. Even so, Tornado events are considered to be a low-probability event, but with the potential to have a significant impact when and where they do occur.

Snow Storm

The winter months can bring a wide variety of hazards to the Middle Peninsula, including blizzards, snowstorms, ice, sleet, freezing rain, and extremely cold temperatures. All of these weather events can be experienced throughout the state, depending on the depth of cold air that is in place over the region when the storm event comes. The Middle Peninsula's biggest winter weather threats come from Northeasters or Nor'easters. These large storms form along the southern Atlantic coast and move northeast into Virginia along the Mid-Atlantic coast. Winter

storm events can bring strong winds and anything from rain to ice to snow to even blizzard conditions over a very large area. This combination of heavy frozen precipitation and winds can be quite destructive and lead to widespread utility failures and high cleanup costs. Nor'easters may occur from November through April, but are usually at their worst in January, February, and March.

The impacts of winter storms are minimal in terms of property damage and long-term effects. The most notable impact from winter storms is the damage to power distribution networks and utilities. Severe winter storms with significant snow accumulation have the potential to inhibit normal functions of the Middle Peninsula. Governmental costs for this type of event are a result of the needed personnel and equipment for clearing streets. Private sector losses are attributed to lost work when employees are unable to travel. Homes and businesses suffer damage when electric service is interrupted for long periods. Health threats can become severe when frozen precipitation makes roadways and walkways very slippery and due to prolonged power outages and if fuel supplies are jeopardized. Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or when trees fall due to excessive ice accumulation on branches. The primary impact of excessive cold is increased potential for frostbite, and potentially death as a result of over-exposure to extreme cold. Some secondary hazards extreme/excessive cold present is a danger to livestock and pets, and frozen water pipes in homes and businesses.

Hazard: Flooding and erosion (2).

Floodplain Properties and Structures

While floodplain boundaries are officially mapped by FEMA's National Flood Insurance Program (NFIP), flood waters sometimes go beyond the mapped floodplains and/or change courses due to natural processes (e.g., accretion, erosion, sedimentation, etc.) or human development (e.g., filling in floodplain or floodway areas, increased imperviousness areas within the watershed from new development, or debris blockages from vegetation, cars, travel trailers, mobile homes and propane tanks).

In addition to tidal flooding, some regions of the Middle Peninsula are subject to flooding events induced by rain associated with a hurricane or a tropical storm, which can produce extreme amounts of rainfall in short periods of time. In August 2004, Tropical Storm Gaston dumped 14 inches of rain in a matter of hours on King William County, washing out numerous roads and bridges. This storm qualified the county for disaster aid through a Presidential Disaster Declaration.

Flooding of vacant land or land that does not have a direct effect on people or the economy is generally not considered a problem. Flood problems arise when floodwaters cover developed areas, locations of economic importance, infrastructure or any other critical facility. Low-lying land areas of Essex, Gloucester, Mathews, and Middlesex Counties and the lower reaches of King and Queen and King William Counties are highly susceptible to flooding, primarily from coastal storm when combined with tidal surges.

Probability

Floods typically are characterized by frequency, for example, the "1%-annual chance flood," commonly referred to as the "100-year" flood. While more frequent floods do occur, in addition to larger events that have lower probabilities of occurrence, for most regulatory and hazard identification purposes, the 1%-annual chance flood is used.

Hazard: Extreme Temperatures (3).

Extreme heat, generally associated with drought conditions, is a phenomenon that is generally confined the months of July and August, although brief periods of excessive heat have occurred in June and September. Extreme heat can be defined either by actual air temperature, or by the heat index, which relates the combined effects of humidity and air temperature on the body. Extreme heat is not an annual event in the Middle Peninsula. Although heat advisories are issued near every year, life-threatening extreme heat is a rare occurrence in the Middle Peninsula region. The frequency of occurrence is dependent entirely upon the extreme heat criteria used (i.e. heat index vs. air temperature). The primary impact of extreme heat is increased potential for hyperthermia, which can be fatal to the elderly and infirmed. In addition, there is an increased risk of dehydration, if proper steps are not taken to ingest adequate amounts of non-alcoholic fluids. The impact of extreme heat is most prevalent in urban areas, which are not found in the Middle Peninsula. Secondary impacts of excessive heat are severe strain on the electrical power system, and potential brownouts or blackouts.

Drought(4).

Empirical studies conducted over the past century have shown that drought is never the result of a single cause. It is the result of many causes, often synergistic in nature, and therefore often difficult to predict more than a month or more in advance. In fact, an area may already be in a drought before drought is even recognized. The immediate cause of drought is the predominant sinking motion of air (subsidence) that results in compressional warming or high pressure, which inhibits cloud formation and results in lower relative humidity and less precipitation. Most climatic regions experience varying degrees of dominance by high pressure, often depending on the season. Prolonged droughts occur when large-scale anomalies in atmospheric circulation patterns persist for months or seasons (or longer). The extreme drought that affected the United States and Canada during 1988 resulted from the persistence of a large-scale atmospheric circulation anomaly (National Drought Mitigation Center, 2004). There have been four major statewide droughts since the early 1900's (USGS, 2002).

Other Hazards

Structural Fire (1)

An urban-wild land interface fire includes situations in which a wildfire enters an area that is developed with structures and other human developments. In UWI fires, the fire is fueled by both naturally occurring vegetation and the urban structural elements themselves. According to the National Fire Plan issued by the U.S. Departments of Agriculture and Interior, the urban-wild land interface is defined as "…the line, area, or zone where structures and other human development meet or intermingle with undeveloped wild lands or vegetative fuels."

A wildfire hazard profile is necessary to assess the probability of risk for specific areas. Certain conditions must be present for a wildfire hazard to occur. A large source of fuel must be present; the weather must be conducive (generally hot, dry, and windy); and fire suppression sources must not be able to easily suppress and control the fire. After a fire starts, topography, fuel, and weather are the principal factors that influence wildfire behavior. VDOF defines woodland home communities as clusters of homes located along forested areas at the wild land-urban interface that could possibly be damaged during a nearby wildfire incident.

The Virginia wildfire season is normally in the spring (March and April) and then again in the fall (October and November). During these months, the relative humidity is 5-76 usually lower and the winds tend to be higher. In addition, the hardwood leaves are on the ground, providing more fuel and allowing the sunlight to directly reach the forest floor, warming and drying the surface fuels.

Probability

The probability of wildfires is difficult to predict and is dependent on many things, including the types of vegetative cover in a particular area, and weather conditions, including humidity, wind, and temperature.

Hazardous Materials (2)

HAZMAT can be defined as a material (as flammable or poisonous material) that would be a danger to life or to the environment if released without precautions. Furthermore, a hazardous material is any substance or material in a quantity or form that may pose a reasonable risk to health, the environment, or property. The risk of hazardous material risks will vary amongst Middle Peninsula as it includes incidents involving substances such as toxic chemicals, fuels, nuclear wastes and/or products, and other radiological and biological or chemical agents. In addition to accidental or incidental releases of hazardous materials due to fixed facility incidents and transportation accidents, regions must be ready to respond to hazmat releases as potential terrorism. It's important to note that the risk of a Hazmat incident are unpredictable and will vary amongst Middle Peninsula localities.

HAZMAT is carried by a number of vehicles throughout the region, and while the Commonwealth has a HAZMAT plan, local jurisdictions would be the first responders on scene if an accident/spill where to occur.

HAZMAT Vulnerability

The effects of hazardous material is ultimately dependent on the type and amount of hazardous material, however injuries and/or deaths could occur as a result of a hazmat incident. They can pose risk to health, safety, and property during transportation. According to VDEM, "A business might have to evacuate depending on the quantity and type of chemical released or local officials might close a facility or area for hours, possibility days until a substance is properly cleaned up. Businesses that store, produce or transport hazardous materials will be fined for sills. The business involve in the release would typically be responsible for the cost of the clean up. A business that is located near the site of the hazardous site of a hazardous materials spill or release is likely to be unaffected unless the substance is airborne and poses a threat to areas outside the accident site. In that case local emergency official would order an immediate evaluation of areas that could potentially be affected. Depending on the type of hazardous substance, it could take

hours or days for emergency official to deem the area safe for return." Ultimately this would impact business productivity and could impact the local/regional economy.

Hazards Not Addressed In This Plan

Some hazards addressed by Virginia's All-Hazard Mitigation Plan are not addressed in this Plan. After profiling these hazards, it was determined that a full risk assessment was not necessary because risks from these hazards are extremely low for the Tribe's land located in King William County and mitigation efforts either are unnecessary or difficult to address.

Hazards Addressed In This Plan

The Tribe has decided to focus on addressing the following hazards in this Plan:
Wildfire, Flood, Violent Storms (includes both winter storms and summer storms), Structural Fire, and Hazardous Materials.

Goals and Mitigation Strategies

Hazard Mitigation, as defined by the Disaster Mitigation Act of 2000, is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards. Studies on Hazard Mitigation show that for each dollar spend on mitigation; society saves an average of four dollars in avoided future losses (Multi-hazard Mitigation Council, 2001). Mitigation can take many different forms from planning, construction projects to public education.

This mitigation strategy for the Tribe, in partnership with federal and state planning activities establish a common set of goals. The goals are broad, forward-looking statements that outline in general terms what the Tribe would like to accomplish.

Mitigations Goals:

1. Maintain and enhance the Reservation's capacity to continuously make it less vulnerable to all hazards.

2. Improve the coordination and communication with Federal, State, Other Tribal, Regional, Local emergency management personnel and other potential partners.

3. Improve communication with Tribal members to make the community less vulnerable to all hazards, and increase their understanding of hazard mitigation.

Objectives:

1. Prevent hazard losses through planning and administrative activities.

2. Protect tribal members by structural security measures such as the building of a "safe house" for tornado or flooding risk reduction.

3. Educate Tribal members through outreach projects, media campaigns, and social media about safety and risk reduction.

4. Improve and maintain structures and infrastructure to reduce the impact of hazards on people and property.

Mitigation Strategy

The Pamunkey Tribe's Mitigation Strategy is:

1. Ongoing with a long range strategy plan being currently conducted
2. Reviewed periodically
3. Agile in order to address current needs within the overall goals of the Plan
4. Responsive to the community
5. Coordinated with partners

Priorities

The coordination of the process to establish priorities for the hazard mitigation action plan is the responsibility of Tribal Emergency Manager. Depending on the type, extent, cost and other factors about specific actions, the responsibility for approvals, funding and approaches may fall with another part of the Tribal Government.

Prioritization of Hazard

The Tribe is susceptible to a number of hazards, ranging from natural hazards to deliberate acts of vandalism, sabotage and violence. The Tribe has identified seven potential hazards.

Although it is beneficial to review and prepare for likely, specific hazards, such as Tornados, Wildfires and Winter Storms, which are frequent and have the potential to be a threat to human life and infrastructure, this approach alone does not protect the community.

Because of this, the goals, objectives and strategies are not based on individual threats of specific Hazards, but the resource being protected. Many of these resources are vulnerable to specific hazards, and risk from those specific hazards will be addressed.

Prioritizing Strategies

The process used by the Tribe's Emergency Management Coordinator involved first identifying goals and their respective objectives based on risk assessments and review of the historical risks and probabilities.

This information was presented to the Tribe by the Emergency Management Coordinator. The Tribe reviewed the information based on the following.

Actions are based on:

1. The potential risk associated with each particular hazard;

2. The ability of the proposed action to have a positive impact upon minimizing or eliminating the risk from the hazard;

2. Overall cost of associated with the proposed action; and

4. The ability of resources to fund and implement the action in a timely manner

Capability Assessment

This benefits the Tribe in obtaining grant funding for equipment and hazard mitigation plan updates as Virginia includes Tribal Governments as an eligible government entity both on the regional and state level. This process demonstrates the commitment Virginia has to the Tribal Governments than having them apply through the county which contains their Tribal lands or directly to the federal government for these. The Virginia Department of Emergency Management (VDEM) Grants Office works cooperatively with the Reservation's Emergency Manger in the application and grant monitoring process.

The Planning Process

The Tribe used the planning process developed by the Federal Emergency Management Agency (now U.S Dept of Homeland Security/FEMA) as a guide for its planning process. The four elements of that process are:

1. Organize Resources
    a. Create Tribal Annex to existing Middle Peninsula Hazardous Mitigation Plan
    b. Fire and EMS MOA between Pamunkey Tribe and Prince William County

2. Assess Risk
    a. Identify and prioritize natural, technical and human caused hazards
    b. Prioritize those hazards
    c. Identify how those hazards could affect key facilities

3. Develop Mitigation Plan
    a. Develop mitigation strategies
    b. Determine priorities of addressing potential hazards

4. Implement the plan and monitor the progress
    a. Community members from the Pamunkey Tribe and King William County put the plan into action
    b. Evaluate efforts for effectiveness
    c. Revisit and revise plans annually

Authority

 U.S. Public Law 106-390 (Disaster Mitigation Act of 2000).

Documentation of the Planning Process

The Tribe assigned the Tribal Emergency Manager as the entity responsible to guide and direct the planning process.

The Tribe coordinated with King William County bordering the reservation.
Emergency services professionals from King William County are invited to the Tribe's meetings where the Disaster Mitigation Planning is discussed. This relationship is ongoing, and has grown to the point that all parties are full partners and exercise plans together.

Public Participation

The Tribe conducts monthly tribal meetings. These meetings were used as the platform to inform the community about the Tribe's Hazard Mitigation grant and planning. In addition Tribe member feedback about past hazards and concerns were documented and recorded at these same meetings to meet the hazard mitigation grant requirements. Chief Robert Gray, the Tribe's Emergency Management Coordinator, facilitates the discussion on hazard mitigation planning. This information was used in the risk assessments and action plans.

HAZARD MITIGATION PLAN SURVEY

The Reservation's Emergency Management Office is currently in the process of updating its Hazard Mitigation Plan. An important area is to receive community feedback on what hazards are facing residents that may affect their daily lives.

Below is a list of hazards which we would like to have you make comments on about your concerns if any of these would affect you or your families. Also, if there are areas we missed, please feel free to add those concerns. We have also provided an area for comments – you may use this area to provide any information or opinion you believe we should incorporate into the planning.

NATURAL DISASTERS

Wild Fires?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Floods or Washout Area?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Winter Storms (Blizzards, High Winds, Heavy Snow)?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Summer Storms (Tornadoes, Thunderstorms)?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

TECHNICAL/HUMAN INDUCED

Structural Fire?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Hazardous Materials Transported on Roadways?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Widespread Power Failure?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Water Supply Contamination?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Infectious Disease?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Other?

□Very Concerned □Somewhat Concerned □Not Concerned

Comments:

Once you have written your comments please bring back to the next Community Meeting.

Continued Public Involvement

Community involvement is an essential ingredient of the planning process. We will continue to use all of our communications opportunities, including regularly scheduled meetings and our website to engage the community in its mitigation planning and implementation.

Project Implementation

Project implementation will be the responsibility of the Tribe's Emergency Management Coordinator.

Each year the action plan will be reviewed and updated by the Emergency Management Coordinator. The Emergency Management Coordinator will inform Tribe members in which projects have been completed and those left to be implemented. Those activities not completed during the first year will be re-evaluated and included in the first year of the new action plan if deemed appropriate.

Incorporation into Existing Planning Resources

This action plan serves as a guide to spending priorities but will be adjusted annually to reflect current needs and financial resources. Some strategies will require outside funding from the state or federal agencies to implement. Priority for Capital Improvement on the Pamunkey Reservation is the establishment of a safe house with development of directions for residents to follow in the event of wind or flood events. If outside funding is not available the strategy will be set aside until new sources of funding can be identified.

Project Monitoring, Evaluation, Updating and Plan Adoption

The Hazard Mitigation Plan Annex will be reviewed and updated yearly by the Emergency Management Coordinator. The Emergency Management Coordinator will advise the community 30 days in advance of the monthly community meeting of the intent to review the mitigation plan. The content and scope of the Plan review and evaluation will address the following questions:

1. Hazard Identification: Have the risks and hazards changed?
2. Goals and objectives: Are the goals and objectives still able to address the current and expected conditions?
3. Mitigation Projects and Actions:
    a. What is the status of the project?
    b. Has it been completed? If not completed, has it been started?
    c. Identify the date that the project was started and any challenges faced.
    d. What percentage has been completed

e. And the amount of funds expended?
f. The status of funding for the project: projected costs less than expected, currently on target or will require additional funds.

For FEMA supported projects, progress reports will be submitted to FEMA on a quarterly basis, or as required throughout the project duration. The quarterly reporting will depend on the type of project, its funding source and the associated requirements. At a minimum, the quarterly report shall address:

1. Project Completion Status
2. Project Challenges/Issues (if any)
3. Budgetary Considerations (Cost Overruns or Underruns)
4. Detailed Documentation of Expenditures

The VDEM Grants Department will handle the financial reports and the Tribal Emergency Management Coordinator will monitor and prepare the progress reports. When FEMA supported projects are completed, the project closeout documents will be prepared by the VDEM Grants Department with any necessary input by the Tribal Emergency Management Coordinator.

The State and FEMA approved Plan will be presented before the Tribal Council for an official concurrence and adoption of the changes. Community members will have access to the Plan at the office of the Tribal Emergency Management Coordinator.

Going forward the Tribal Emergency Management Coordinator will participate with the Middle Peninsula PDC in their annual review to ensure regional impacts and initiatives are shared and included the Middle Peninsula Hazard Mitigation Plan.

Tribal Assurances

The Tribe will continue to comply with all applicable Federal statutes and regulations in effect for those periods when the Tribe receives grant funding.

Appendix A: HAZARD MITIGATION STRATEGY/ACTIONS

2018 Mitigation Goals

1. Winter/summer storm risks reduced.
2. Flooding risk reduced
3. Wildfires risks reduced.
4. Hazardous Material release risk reduced.

Each of the 2018 mitigation strategy/actions is discussed below:

1) Construction of a safe house on the reservation for storm sheltering.

This strategy/action is to be scheduled in 2018 with the application for a FEMA Hazardous Mitigation Grant.

2) NOAA weather radios to be placed in all public buildings for early storm warnings.

This strategy/action is to be scheduled in 2018. They will maintain their rating as a NOAA Storm Ready Community by recertifying every two years.

3) Update land use plans to include flood plains; prepare flood maps

This strategy/action is to be scheduled in 2018.

4) Ensure new residential home sites have large enough fire breaks to reduce wildfire risks, and conduct yearly controlled burns.

This action is to be scheduled in 2018. It has been determined to be a viable ongoing strategy/action.

After the assessment was completed, the Tribal Emergency Management Coordinator, using the response from the community members, then brainstormed new strategies/actions to be added, reviewing the results of the vulnerability analysis, the capability assessment, and the goals and objectives. Each strategy/action was reviewed based on the categories of the Tribe's cultural beliefs, spirituality, care takers of the land and to ensure adherence to Tribal laws, and statutes. Once the strategies/actions were finalized, the lead agency, potential funding sources and timeframe was completed for each strategy/action.

The following table includes the strategies for the 2018 plan and indicates the status of the actions, who is responsible (lead agency) potential funding sources and the timeframe.

Strategies/Actions to Mitigate Effects of Hazards

ALL HAZARDS

Goal	Strategy/Action	Status: New/Ongoing /Completed	Lead Agency	Potential Funding Sources	Timeframe
2018 #1	Tribe members vulnerable to severe Summer storms such as tornado activity. Action desired is to construct a safe house of the reservation for storm sheltering.	New	Emergency Management Coordinator	FEMA Grants	Ongoing
2018 #1	NOAA weather radios to be placed in all government buildings for early storm warnings	New	Emergency Management Coordinator	Net Revenue	Ongoing

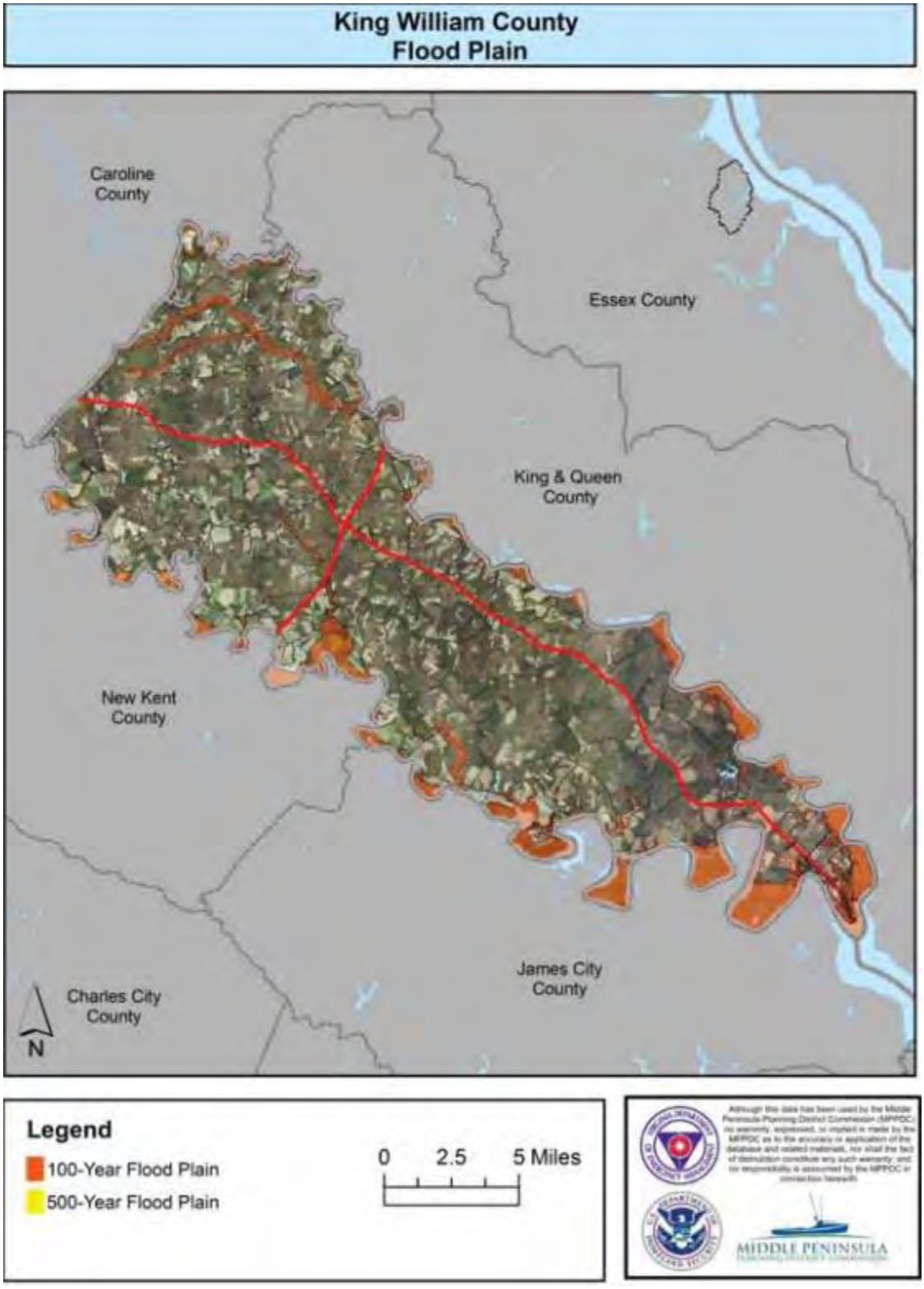
Goal	Strategy/Action	Status: New/Ongoing /Completed	Lead Agency	Potential Funding Sources	Timeframe
FLOOD *Probability*-High, *Impact*-Moderate to High and *Overall Risk*-High					
2018 #2	Update land use plans to include flood plains; prepare flood maps	No SFHA	Emergency Management Coordinator	N/A	N/A

Goal	Strategy/Action	Status: New/Ongoing /Completed	Lead Agency	Potential Funding Sources	Timeframe
WILDFIRES *Probability*-High, *Impact*-Moderate to High and *Overall Risk*-High					
2018 #3	Ensure residential home sites have large enough fire breaks to reduce wildfire risks, and conduct yearly controlled	New	Emergency Management Coordinator	Net Revenue	Ongoing

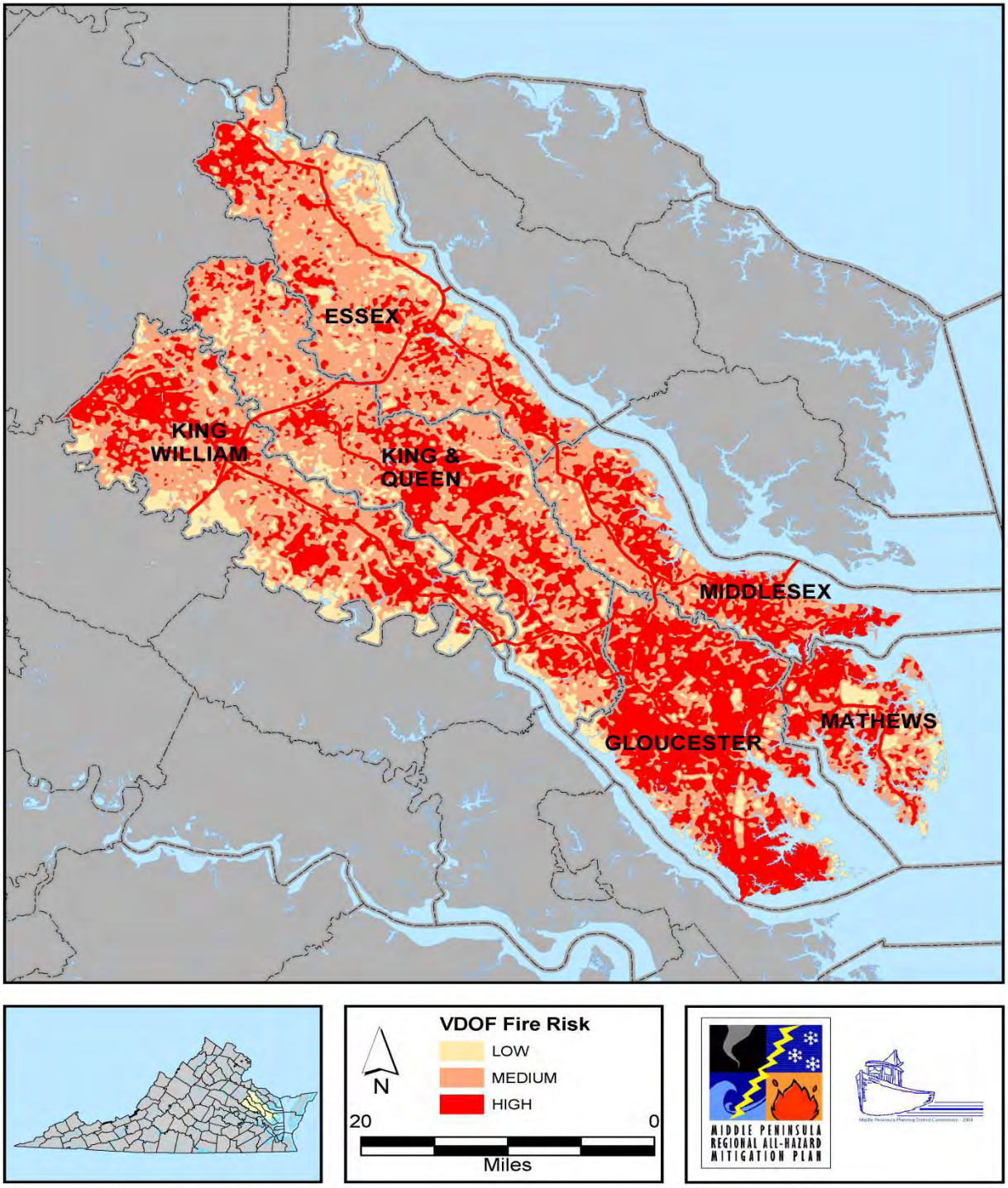
	burns from early spring				

Goal	**Strategy/Action**	**Status:** New/Ongoing /Completed	**Lead Agency**	**Potential Funding Sources**	**Timeframe**
HAZARDOUS MATERIALS *Probability*-High, *Impact*-Moderate to High and *Overall Risk*-High					
2018 #4	Response to transportation accidents: emergency response for victims and environmental clean-up	New	VDEM, VADOT, EPA	EPA	As needed

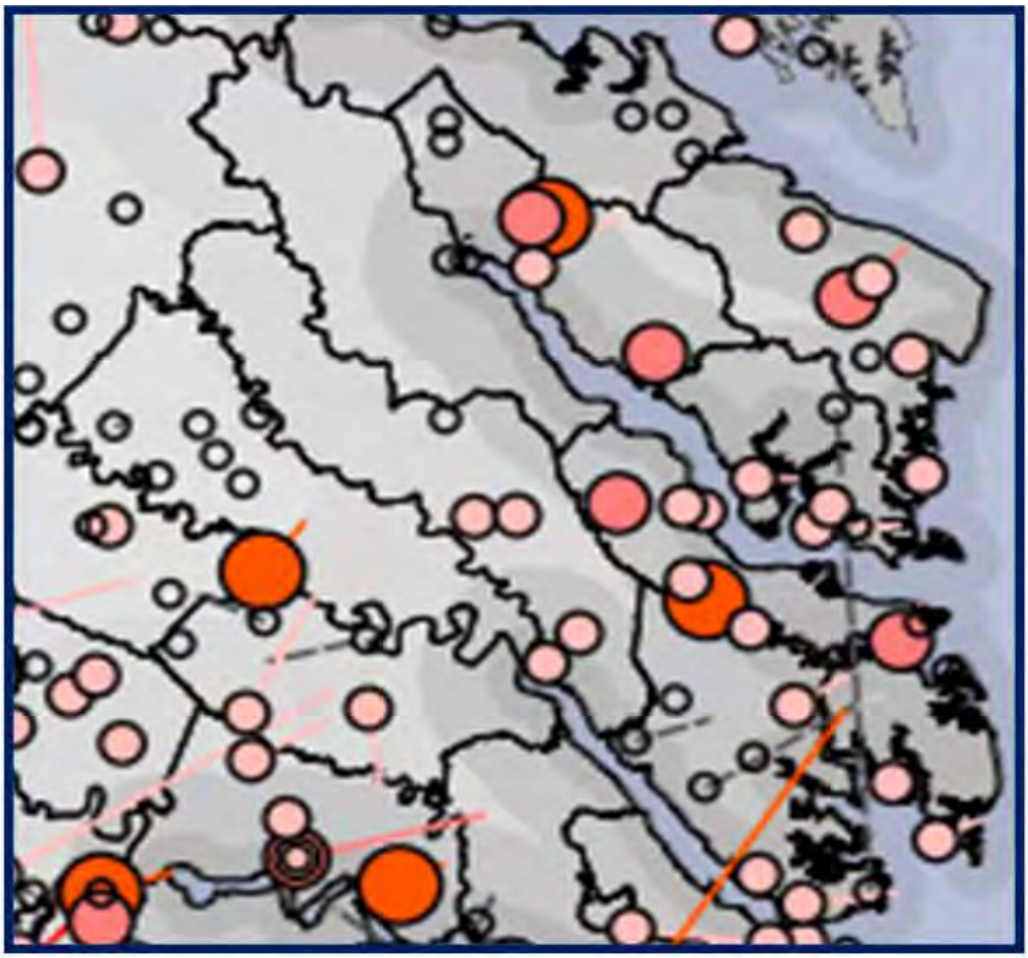
Appendix B:Maps



Middle Peninsula Wildfire Risk. Throughout the region risk to wildlife varies due to historic fire incidents, land cover, topographic characteristics, population density and distance to roads.



Historic Tornado Touchdowns and Tracks 1950-2011



HAZARD IDENFICATION: Historic tornado touchdowns and tracks are symbolized for visual effect and are not drawn to scale. Actual tornado swath widths vary considerably, although more intense tornadoes are generally wider.

CGIT Center for Geospatial Information Technology

VIRGINIA DEPARTMENT OF EMERGENCY MANAGEMENT

DATA SOURCES:

SVRGIS
VGIN Jurisdictional Boundaries
ESRI State Boundaries

LEGEND:

Tornado F-Scale
0
1
2
3
4
5

PROJECTION: *VA Lambert Conformal Conic*
North American Datum 1983

DISCLAIMER: Majority of available hazard data is intended to be used at national or regional scales. The purpose of the data sets are to give general indication of areas that may be susceptible to hazards. In order to identify potential risk in the Commonwealth available data has been used beyond the original intent.

MATHEWS AND GLOUCESTER COUNTIES:
Links to Locality Comprehensive Plans Within Project Area

Mathews County- https://mathewscountyva.gov/DocumentCenter/View/213/2030-Comprehensive-Plan-PDF

Gloucester County – https://pub.gloco-sitedocs.com/PZ/Comp_Plan/2016_Gloucester_County_Comprehensive_Plan_and_Appendix_J.pdf

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

November 6, 2023

Mr. Jake Shaw
Virginia Department of Conservation and Recreation
Community Flood Preparedness Fund
600 East Main Street, 24th floor
Richmond, VA 23219-2094

Dear Mr. Jake Shaw,

This is authorization for MPPDC staff to request funding through Virginia Department of Conservation and Recreation's Community Flood Preparedness Fund Round 4.

If you have any questions about the proposal application, please feel free to reach out to me by email at llawrence@mppdc.com or by phone at 804-758-2311.

Sincerely,

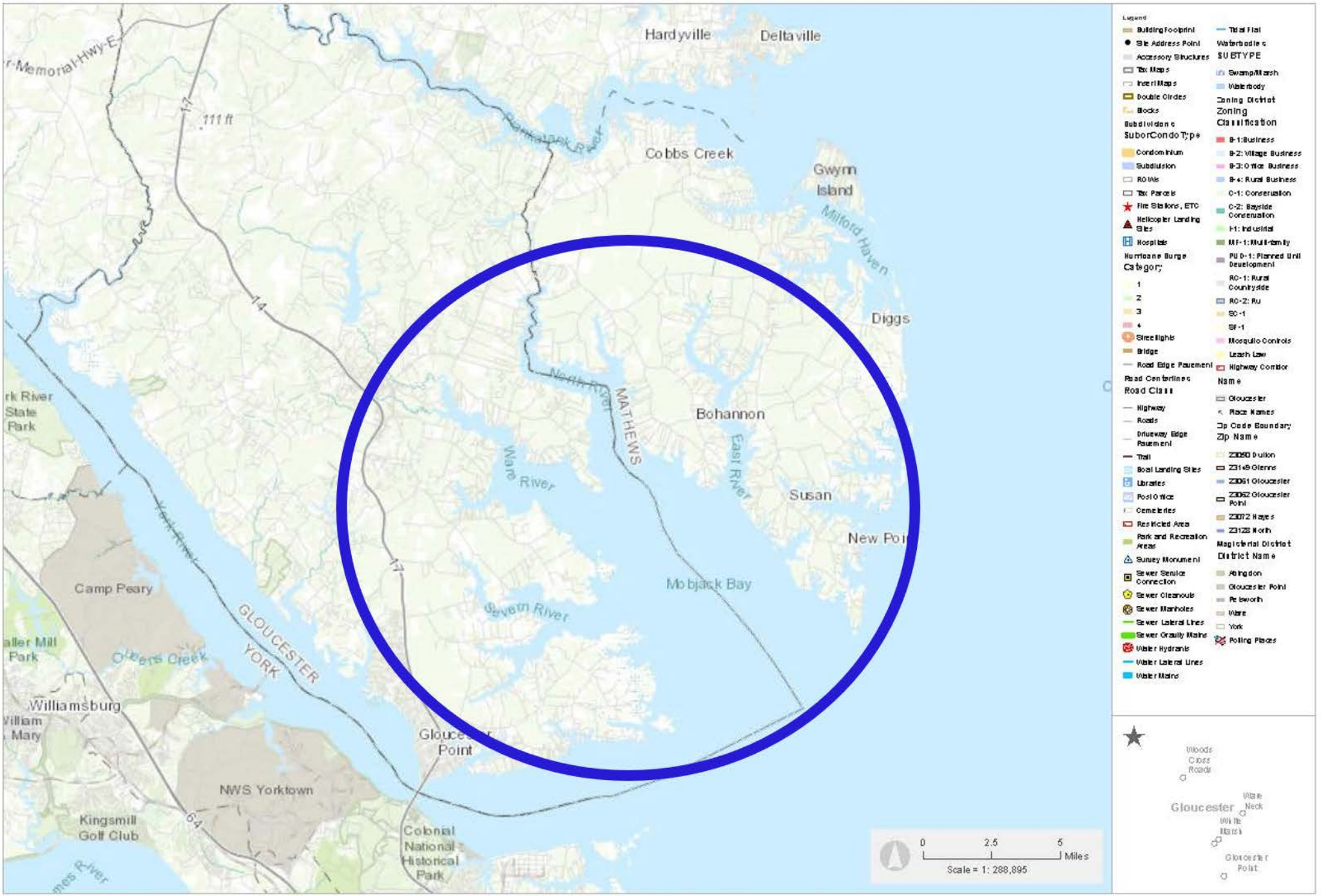
Lewis Lawerence
Executive Director

Saluda Professional Center ♦ 125 Bowden Street ♦ P.O. Box 286 ♦ Saluda, Virginia 23149
(Phone) 804 758-2311 ♦ (Fax) 804 758-3221 ♦ (Email) pdcinfo@mppdc.com
https://www.mppdc.com

COUNTY OF GLOUCESTER VIRGINIA

Project Geography of Focus

Gloucester County, VA
www.gloucesterva.info



Legend

- Building Footprint
- Site Address Point
- Accessory Structures
- Tax Maps
- Inset Maps
- Double Circles
- Blocks
- Subdivision
- SuborCondoType
- Condominium
- Subdivision
- ROWs
- Tax Parcels
- Fire Stations, ETC
- Helicopter Landing Sites
- Hospitals
- Hurricane Surge Category
- 1
- 2
- 3
- 4
- Street lights
- Bridge
- Road Edge Pavement
- Road Centerlines
- Road Class
- Highway
- Roads
- Driveway Edge Pavement
- Trail
- Boat Landing Sites
- Libraries
- Post Office
- Cemeteries
- Restricted Area
- Park and Recreation Areas
- Survey Monument
- Sewer Service Connection
- Sewer Cleanouts
- Sewer Manholes
- Sewer Lateral Lines
- Sewer Gravity Mains
- Water Hydrants
- Water Lateral Lines
- Water Mains
- Tidal Flat
- Waterbodies
- SUBTYPE
- Swamp/Marsh
- Waterbody
- Zoning District
- Zoning Classification
- B-1:Business
- B-2: Village Business
- B-3: Office Business
- B-4: Rural Business
- C-1: Conservation
- C-2: Bayside Conservation
- I-1: Industrial
- MF-1: Multi-family
- PUD-1: Planned Unit Development
- RC-1: Rural Countryside
- RC-2: Ru
- SC-1
- SF-1
- Mosquito Controls
- Leash Law
- Highway Corridor
- Name
- Gloucester
- Place Names
- Zip Code Boundary
- Zip Name
- 23050 Dutton
- 23149 Glenns
- 23061 Gloucester
- 23062 Gloucester Point
- 23072 Hayes
- 23128 North
- Magisterial District
- District Name
- Abingdon
- Gloucester Point
- Petsworth
- Ware
- York
- Polling Places

Gloucester County assumes no responsibility or liability for, or in connection with, the accuracy, reliability or use of the information provided here.

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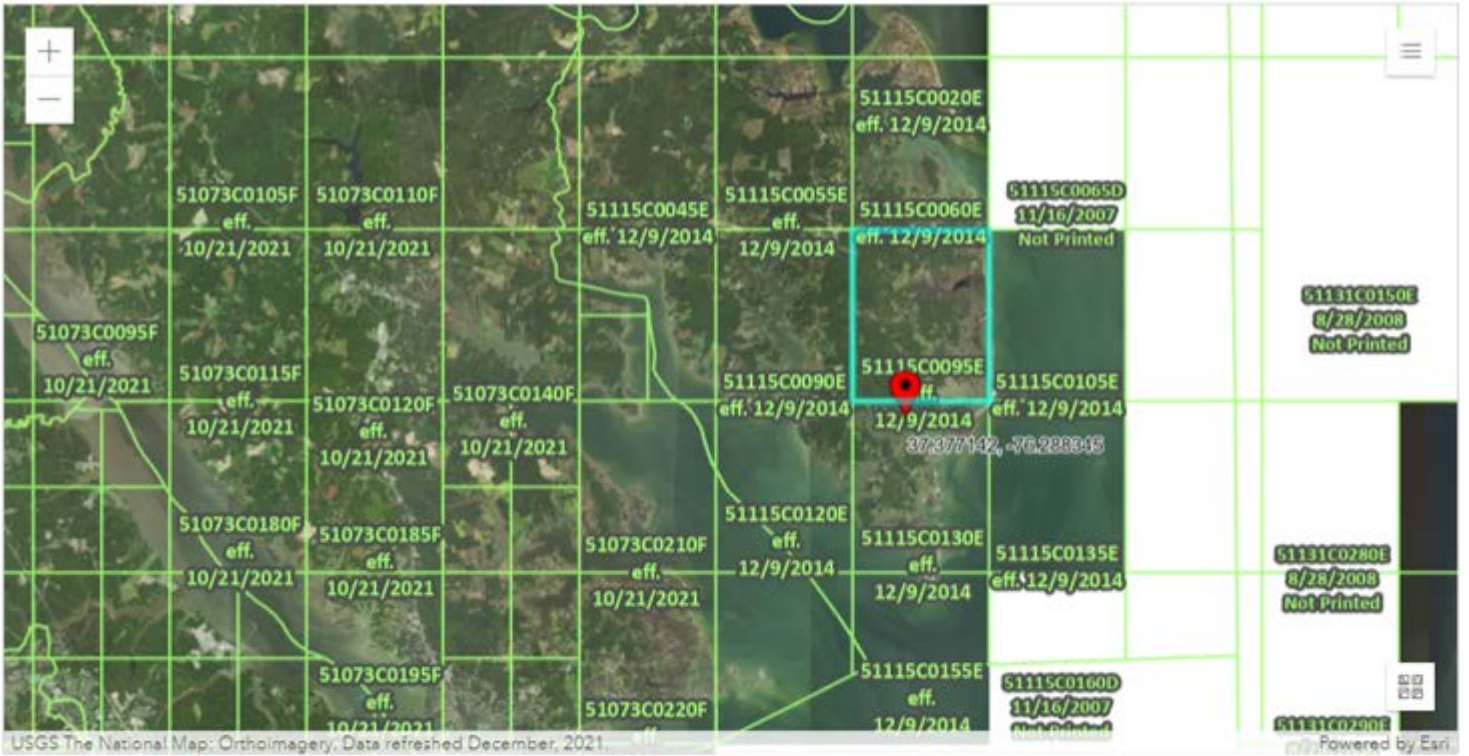


PIN
- Approximate location based on user input and does not represent an authoritative property location

MAP PANELS
- Selected FloodMap Boundary
- Digital Data Available
- No Digital Data Available
- Unmapped

OTHER AREAS
- NO SCREEN — Area of Minimal Flood Hazard Zone X
- Effective LOMRs
- Area of Undetermined Flood Hazard Zone D
- Otherwise Protected Area
- Coastal Barrier Resource System Area

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) Zone A, V, A99
- With BFE or Depth
- Regulatory Floodway Zone AE, AE, AH, VE, AR

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile Zone X
- Future Conditions 1% Annual Chance Flood Hazard Zone X
- Area with Reduced Flood Risk due to Levee. See Notes. Zone X
- Area with Flood Risk due to Levee Zone D

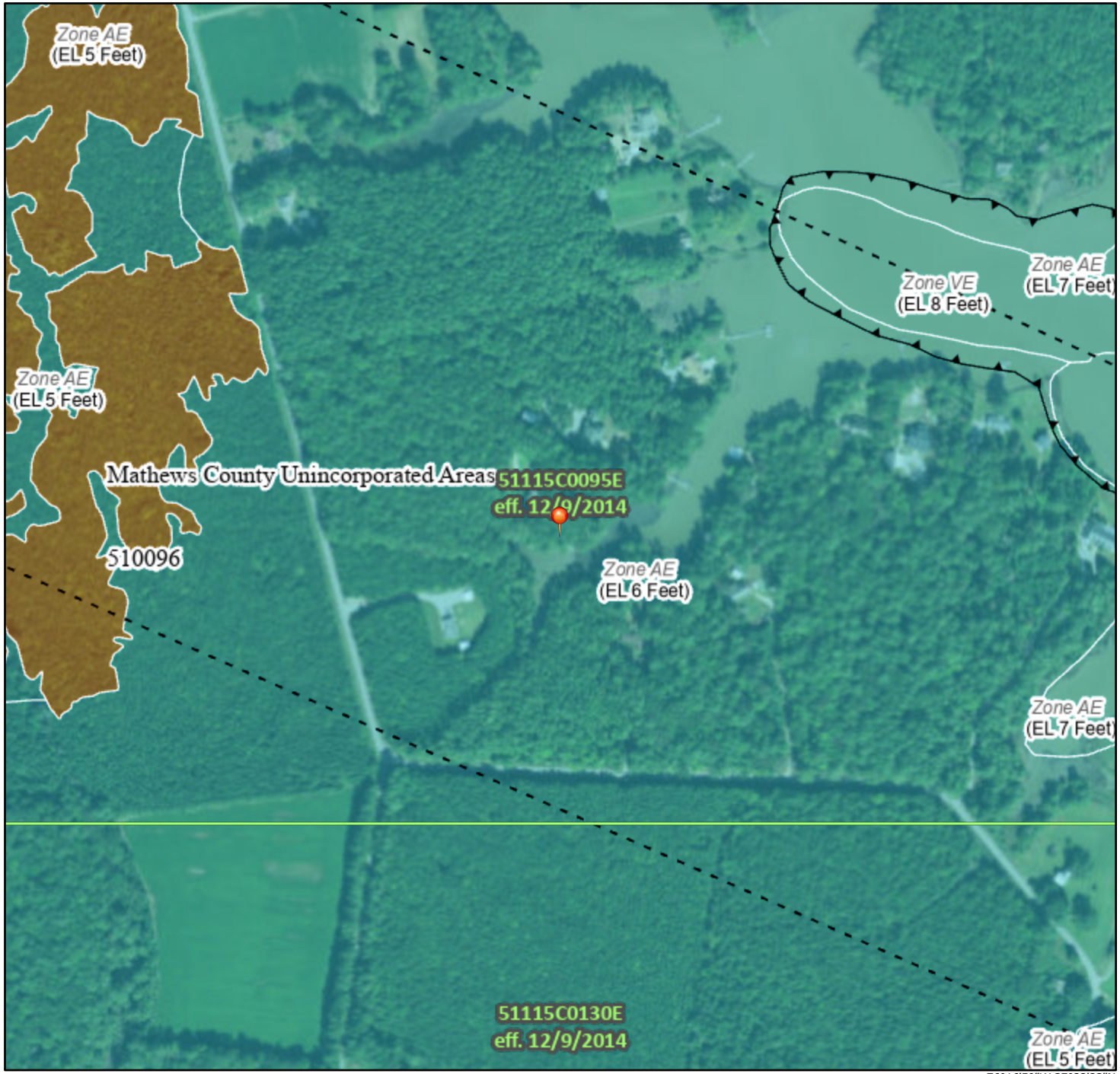
OTHER FEATURES
- 20.2 / 17.5 — Cross Sections with 1% Annual Chance Water Surface Elevation
- Coastal Transect
- 13 — Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

National Flood Hazard Layer FIRMette

FEMA

76°17'37"W 37°22'52"N



76°16'59"W 37°22'23"N

0 250 500 1,000 1,500 2,000 Feet

1:6,000

Basemap Imagery Source: USGS National Map 2023

Legend

SEE FIS REPORT FOR DETAILED LEGEND AND INDEX MAP FOR FIRM PANEL LAYOUT

SPECIAL FLOOD HAZARD AREAS
- Without Base Flood Elevation (BFE) *Zone A, V, A99*
- With BFE or Depth *Zone AE, AO, AH, VE, AR*
- Regulatory Floodway

OTHER AREAS OF FLOOD HAZARD
- 0.2% Annual Chance Flood Hazard, Areas of 1% annual chance flood with average depth less than one foot or with drainage areas of less than one square mile *Zone X*
- Future Conditions 1% Annual Chance Flood Hazard *Zone X*
- Area with Reduced Flood Risk due to Levee. See Notes. *Zone X*
- Area with Flood Risk due to Levee *Zone D*

OTHER AREAS
- NO SCREEN Area of Minimal Flood Hazard *Zone X*
- Effective LOMRs
- Area of Undetermined Flood Hazard *Zone D*

GENERAL STRUCTURES
- Channel, Culvert, or Storm Sewer
- Levee, Dike, or Floodwall

OTHER FEATURES
- 20.2 Cross Sections with 1% Annual Chance
- 17.5 Water Surface Elevation
- Coastal Transect
- 513 Base Flood Elevation Line (BFE)
- Limit of Study
- Jurisdiction Boundary
- Coastal Transect Baseline
- Profile Baseline
- Hydrographic Feature

MAP PANELS
- Digital Data Available
- No Digital Data Available
- Unmapped

N

The pin displayed on the map is an approximate point selected by the user and does not represent an authoritative property location.

This map complies with FEMA's standards for the use of digital flood maps if it is not void as described below. The basemap shown complies with FEMA's basemap accuracy standards

The flood hazard information is derived directly from the authoritative NFHL web services provided by FEMA. This map was exported on 11/10/2023 at 11:55 AM and does not reflect changes or amendments subsequent to this date and time. The NFHL and effective information may change or become superseded by new data over time.

This map image is void if the one or more of the following map elements do not appear: basemap imagery, flood zone labels, legend, scale bar, map creation date, community identifiers, FIRM panel number, and FIRM effective date. Map images for unmapped and unmodernized areas cannot be used for regulatory purposes.

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The **community map repository** should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where **Base Flood Elevations** (BFEs) and/or **floodways** have been determined, users are encouraged to consult the Flood Profiles and Floodway Data and/or Summary of Stillwater Elevations tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS report should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevations shown on this map apply only landward of 0.0' North American Vertical Datum of 1988 (NAVD 88). Users of this FIRM should be aware that coastal flood elevations are also provided in the Summary of Stillwater Elevations tables in the Flood Insurance Study report for this jurisdiction. Elevations shown in the Summary of Stillwater Elevations table should be used for construction and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the **floodways** were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by **flood control structures**. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures for this jurisdiction.

The **projection** used in the preparation of this map was the North American Datum of 1983 (NAD 83) HARN Virginia State Plane South zone (FIPSZONE 4502). The **horizontal datum** was NAD 83 HARN, GRS80 spheroid. Corner coordinates shown on the FIRM are in latitude and longitude and are referenced to the UTM projection, NAD 83.Differences in datum, spheroid, projection or State Plane zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of this FIRM.

Flood elevations on this map are referenced to the North American Vertical Datum of 1988 (NAVD 88). These flood elevations must be compared to structure and ground elevations referenced to the same **vertical datum**. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and NAVD 88, visit the National Geodetic Survey website at http://www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

NGS Information Services
NOAA, N/NGS12
National Geodetic Survey
SSMC-3, #9202
1315 East-West Highway
Silver Spring, Maryland 20910-3282
(301) 713-3242

To obtain current elevation, description, and/or location information for **bench marks** shown on this map, please contact the Information Services Branch of the National Geodetic Survey at **(301) 713-3242**, or visit its website at http://www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by the Virginia Geographic Information Network (VGIN). This information was photogrammetrically compiled at a scale of 1:2,400 from aerial photography dated 2009.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limit locations.

Please refer to the separately printed **Map Index** for an overview map of the county showing the layout of map panels; community map repository addresses; and a Listing of Communities table containing National Flood Insurance Program dates for each community as well as a listing of the panels on which each community is located.

The AE Zone category has been divided by a **Limit of Moderate Wave Action (LiMWA)**. The LiMWA represents the approximate landward limit of the 1.5-foot breaking wave. The effects of wave hazards between the VE Zone and the LiMWA (or between the shoreline and the LiMWA for areas where VE Zones are not identified) will be similar to, but less severe than those in the VE Zone.

For information on available products associated with this FIRM visit the **Map Service Center (MSC)** website at http://msc.fema.gov. Available products may include previously issued Letters of Map Change, a Flood Insurance Study Report, and/or digital versions of this map. Many of these products can be ordered or obtained directly from the MSC website.

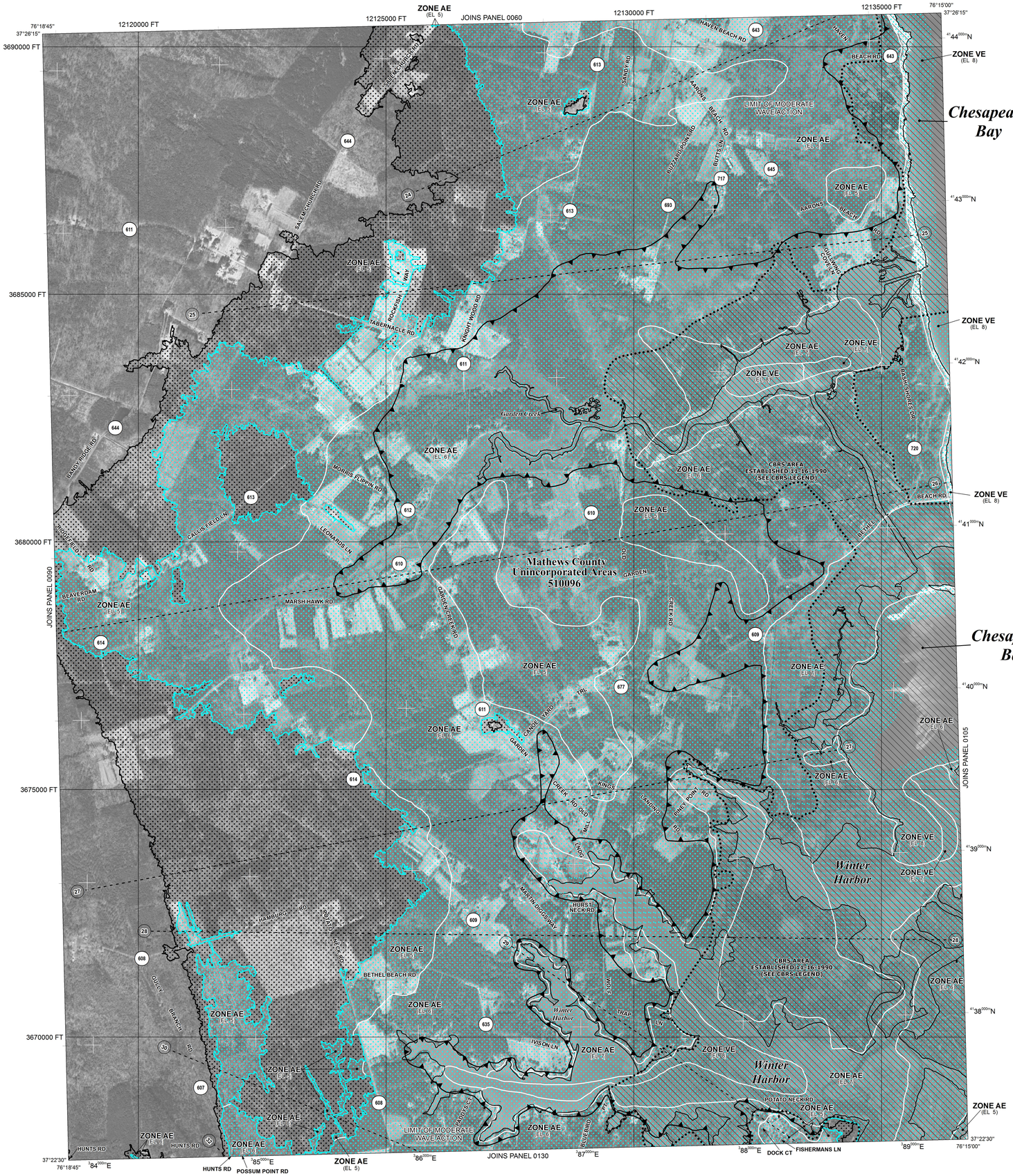
If you have **questions about this map**, how to order products or the National Flood Insurance Program in general, please call the FEMA Map Information eXchange (FMIX) at **1-877-FEMA-MAP** (1-877-336-2627) or visit the FEMA website at http://www.fema.gov/business/nfip.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) LEGEND

11-16-1990 CBRS Area

FLOOD INSURANCE NOT AVAILABLE FOR STRUCTURES NEWLY BUILT OR SUBSTANTIALLY IMPROVED ON OR AFTER NOVEMBER 16, 1990, IN DESIGNATED CBRS AREAS.

Boundaries of the John H. Chafee Coastal Barrier Resources System (CBRS) shown on this FIRM were transferred from the official CBRS source map(s) for this area and are depicted on this FIRM for informational purposes only. The official CBRS maps are enacted by Congress and maintained by the U.S. Fish and Wildlife Service (FWS). The official CBRS maps used to determine whether or not an area is located within the CBRS are available for download at http://www.fws.gov. For an official determination of whether or not an area is located within the CBRS, or for any questions regarding the CBRS, please contact the FWS field office for this area at (804)693-6694.



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD

The 1% annual flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, A99, V, and VE. The Base Flood Elevation is the water-surface elevation of the 1% annual chance flood.

ZONE A	No Base Flood Elevations determined.
ZONE AE	Base Flood Elevations determined.
ZONE AH	Flood depths of 1 to 3 feet (usually areas of ponding); Base Flood Elevations determined.
ZONE AO	Flood depths of 1 to 3 feet (usually sheet flow on sloping terrain); average depths determined. For areas of alluvial fan flooding, velocities also determined.
ZONE AR	Special Flood Hazard Area formerly protected from the 1% annual chance flood by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood.
ZONE A99	Area to be protected from 1% annual chance flood by a Federal flood protection system under construction; no Base Flood Elevations determined.
ZONE V	Coastal flood zone with velocity hazard (wave action); no Base Flood Elevations determined.
ZONE VE	Coastal flood zone with velocity hazard (wave action); Base Flood Elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X	Areas of 0.2% annual chance flood; areas of 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X	Areas determined to be outside the 0.2% annual chance floodplain.
ZONE D	Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

OTHERWISE PROTECTED AREAS (OPAs)

CBRS areas and OPAs are normally located within or adjacent to Special Flood Hazard Areas.

	1% annual chance floodplain boundary
	0.2% annual chance floodplain boundary
	Floodway boundary
	Zone D boundary
	CBRS and OPA boundary
	Boundary dividing Special Flood Hazard Area Zones and boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or flood velocities.
	Limit of Moderate Wave Action
513	Base Flood Elevation line and value; elevation in feet*
(EL 987)	Base Flood Elevation value where uniform within zone; elevation in feet*

* Referenced to the North American Vertical Datum of 1988

A A	Cross section line
23 23	Transect line
	Culvert, Flume, Penstock or Aqueduct
	Road or Railroad Bridge
	Footbridge
87°07'45", 32°22'30"	Geographic coordinates referenced to the North American Datum of 1983 (NAD 83), Western Hemisphere
2°76'000"N	1000-meter Universal Transverse Mercator grid values, zone 18N
600000 FT	5000-foot grid values: Virginia State Plane coordinate system, South zone (FIPSZONE 4502), Lambert Conformal Conic projection
DX5510 ×	Bench mark (see explanation in Notes to Users section of this FIRM panel)
M1.5	River Mile

MAP REPOSITORY
Refer to listing of Map Repositories on Map Index

EFFECTIVE DATE OF COUNTYWIDE
FLOOD INSURANCE RATE MAP
November 16, 2007

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL
December 9, 2014 - to change Base Flood Elevations, to change Special Flood Hazard Areas, to update the effects of wave action, to incorporate Primary Frontal Dune analysis, to reflect revised shoreline, to refelect the effects of coastal erosion

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your Insurance agent or call the National Flood Insurance Program at 1-800-638-6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 METERS

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0095E

FIRM

FLOOD INSURANCE RATE MAP

MATHEWS COUNTY, VIRGINIA
(ALL JURISDICTIONS)

PANEL 95 OF 165

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

COMMUNITY	NUMBER	PANEL	SUFFIX
MATHEWS COUNTY	510096	0095	E

- NOTE -

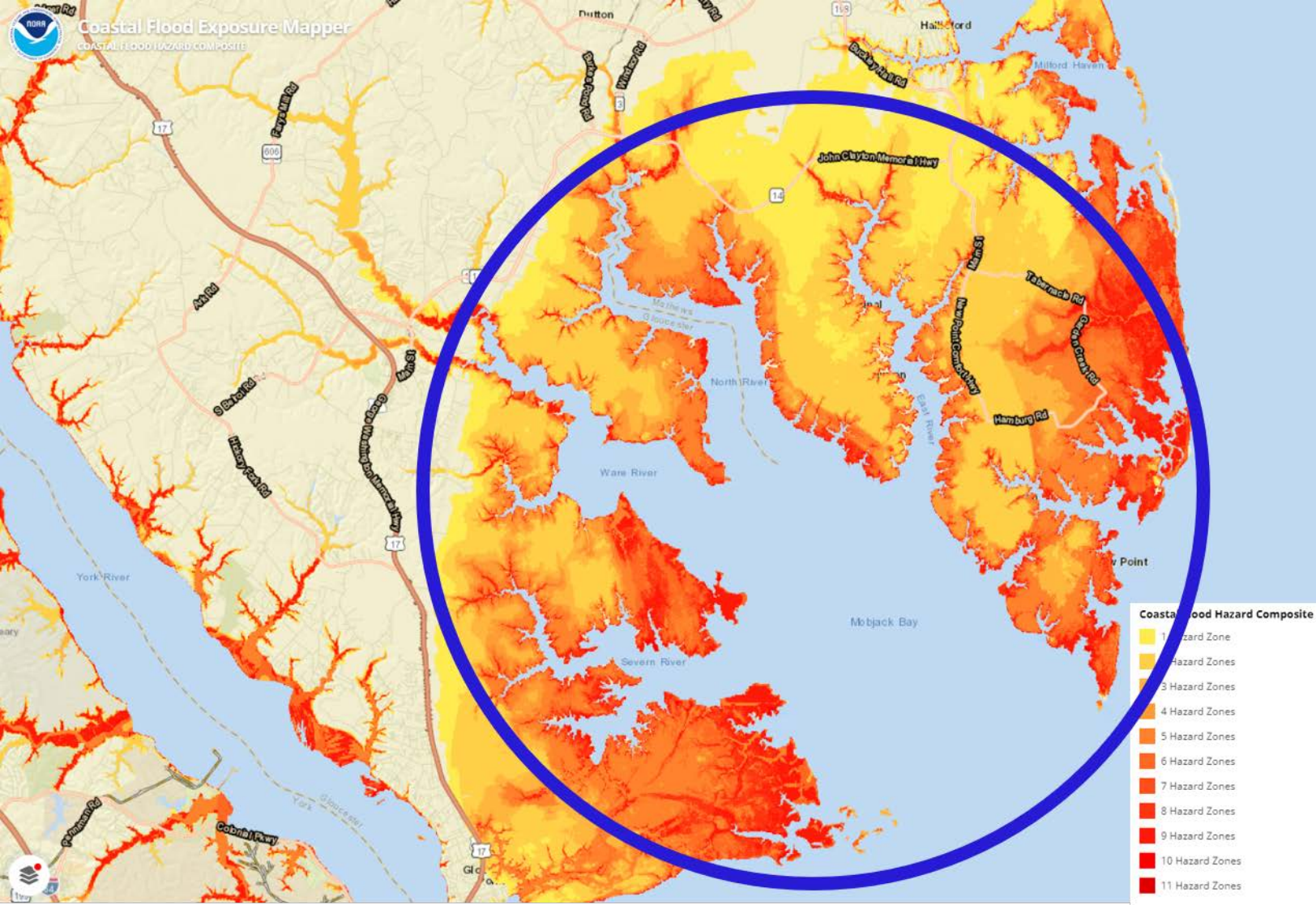
THIS MAP INCLUDES BOUNDARIES OF THE COASTAL BARRIER RESOURCES SYSTEM ESTABLISHED UNDER THE COASTAL BARRIER RESOURCES ACT OF 1982 AND/OR SUBSEQUENT ENABLING LEGISLATION

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

MAP NUMBER
51115C0095E

MAP REVISED
DECEMBER 9, 2014

Federal Emergency Management Agency


Coastal Flood Exposure Mapper
COASTAL FLOOD HAZARD COMPOSITE
Dutton
Hallieford
Milford Haven
Buckley Hall Rd
John Clayton Memorial Hwy
Tabernacle Rd
Robins Creek Rd
New Point Comfort Hwy
Hamburg Rd
Ark Rd
S Bethel Rd
Hickory Fork Rd
George Washington Memorial Hwy
Mathews
Gloucester
North River
East River
Ware River
York River
Mobjack Bay
Severn River
Point
Cobbs Ferry
Coastal Flood Hazard Composite
1 Hazard Zone
2 Hazard Zones
3 Hazard Zones
4 Hazard Zones
5 Hazard Zones
6 Hazard Zones
7 Hazard Zones
8 Hazard Zones
9 Hazard Zones
10 Hazard Zones
11 Hazard Zones

Benefit-cost analysis

Not applicable as the request is below the $2,000,000 threshold.

MAINTENANCE, MANAGEMENT, AND MONITORING PLAN

The MPPDC and project partners propose the following activities as required by the DCR CFPF Round 4 Manual, which will ensure that the public investment of DCR CFPF funds is protected.

MPPDC staff will utilize the below maintenance agreement template, which includes explanation of the responsibilities for monitoring, replacement (as necessary), and reporting of the project following construction. Each property owner will sign this document and MPPDC staff will submit the signed document to DCR prior to any construction occurring. MPPDC staff is willing to work with DCR to modify the agreement and related maintenance, management, and monitoring activities should DCR wish to see these matters handled differently.

DCR Provided
CERTIFICATION OF PROPERTY OWNER
Property Protection Project

Grant No. [Insert Number]
Name: [Name of Property Owner/Entity]
County, State Zip: [Address of Property]
Phone: [Insert Phone Number]
Email: [Insert Email]

The undersigned certifies to the Middle Peninsula Planning Commission District (PDC), that

1. I am/we are the owner/co-owner of [Insert address of Property where project is taking place].
2. I am/we are the recipient of Grant [Insert Grant Number] for the purpose of deploying a nature-based solution on my real property or at [Insert Address] for the purposes of flood prevention or mitigation.
3. I/we received [Insert Award Amount] (DCR Funds) to fund, in whole or in part, the stormwater protection activities including construction of a stormwater collection system on the Historic Antioch Rosenwald School Building.
4. I/we understand that it is my/our obligation to maintain the stormwater collection system for a minimum of 10 years.
5. I/we have the necessary resources to maintain the stormwater collection system for a minimum of ten (10) years.
6. That I agree to annually inspect and certify to both the PDC and the Virginia Department of Conservation and Recreation that the project is maintained in good order for no fewer than ten (10) years.
7. That I agree to permit the PDC or the Virginia Department of Conservation and Recreation to inspect the project to ensure that it is being maintained in good order for a period of ten (10) years after its completion. Inspections may occur at the discretion of the PDC or the Virginia Department of Conservation and Recreation; however, reasonable notice shall be given prior to the inspection, and no project shall be inspected more than once in a calendar year, provided that inspection does not result in needed repairs.
8. That I agree that I will repay the full amount listed in Item 3 if the project is not maintained in good repair for a minimum of ten (10) years.

_____	_____
Signature of Property Owner	Signature of Property Owner
_____	_____
Printed Name	Printed Name
_____	_____
Date	Date

MAINTENANCE, MANAGEMENT, AND MONITORING PLAN

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8. That I agree that I will repay the full amount listed in Item 3 if the project is not maintained in good repair for a minimum of ten (10) years.

_____	_____
Signature of Property Owner	Signature of Property Owner
_____	_____
Printed Name	Printed Name
_____	_____
Date	Date


606
14
14
17
Gloucester Courthouse
Bellamy
Ordinary
Bena
Gloucester Point
Naval Weapons Station
York County Unincorporated Areas
Mathews County
Diggs
Mathews
Bohannon
Peary
Susan
New Point
-0.83
-0.46
-0.77
.34
.62
-0.13
-0.12
-1.17
Legend
Virginia Social Vulnerability Block Groups 2020
Very Low Social Vulnerability
Low Social Vulnerability
Moderate Social Vulnerability
High Social Vulnerability
Very High Social Vulnerability
NFHL_Layers
Political Jurisdictions

MIDDLE PENINSULA
PLANNING DISTRICT COMMISSION

November 6, 2023

Mr. Jake Shaw
Virginia Department of Conservation and Recreation
Community Flood Preparedness Fund
600 East Main Street, 24th floor
Richmond, VA 23219-2094

Dear Mr. Jake Shaw,

This is authorization for MPPDC staff to request funding through Virginia Department of Conservation and Recreation's Community Flood Preparedness Fund Round 4.

This is also a commitment to match this project with MPPDC living shoreline loan funds.

If you have any questions about the proposal application, please feel free to reach out to me by email at llawrence@mppdc.com or by phone at 804-758-2311.

Sincerely,

Lewis Lawerence
Executive Director

Saluda Professional Center ♦ 125 Bowden Street ♦ P.O. Box 286 ♦ Saluda, Virginia 23149
(Phone) 804 758-2311 ♦ (Fax) 804 758-3221 ♦ (Email) pdcinfo@mppdc.com
https://www.mppdc.com

Floodplain Ordinances

Gloucester County Floodplain Ordinance -
https://library.municode.com/va/gloucester_county/codes/code_of_ordinances?nodeId=CH8.5FLMA

Mathews County Floodplain Ordinance –
Chapter 63. Floodplain Management, Code of Ordinances, Mathews County (elaws.us)

Relationship to Other Projects

This project relates to Middle Peninsula regional resilience efforts. For more than 40 years, the Middle Peninsula Planning District Commission (MPPDC) and its participating localities have worked diligently on topics associated with the land water interface, including coastal use conflicts and policies, sea level rise, stormwater flooding, roadside ditch flooding, erosion, living shorelines, coastal storm hazards (e.g., hurricanes, tropical storms), riverine and coastal flooding, and coastal resiliency.

The proposed project is a priority project generated from the Middle Peninsula Regional Flood Resilience Plan, which was approved by DCR in August of 2021. This Flood Resiliency Plan serves as the MPPDC's guiding document for its flood resiliency programs and is comprised of two primary MPPDC-approved policy documents. These documents frame the foundation and implementation of the Middle Peninsula flood protection approach, and are indirectly and directly supported by specific regional planning documents each approved by federal, regional, and/or local partners as required by statute.

Other plans and resources integral to the implementation of the Flood Resiliency Plan include:

Long Term Planning

- Middle Peninsula All Hazard Mitigation Plan - FEMA and Middle Peninsula locality, approved 2021 (MPPDC Website)
    - o This overarching project provides updates every five years on the hazards within the region; it identifies the top hazards within the region and provides a HAZUS assessment that analyzes flooding (riverine and coastal), sea-level rise and hurricane storm surge impacts in the region. Additionally, this plan lists strategies and objectives that guide member localities to mitigate these strategies.
- Middle Peninsula Comprehensive Economic Development Strategy – MPPDC, approved June 2022
- Middle Peninsula VDOT Rural Long Range Transportation Plan – MPPDC, approved annually

Short Term Implementation

- Middle Peninsula Planning District Commission Fight the Flood Program Design - MPPDC Commission, approved June 2020; Chairman approved update 8/6/21
- Middle Peninsula Planning District Commission Living Shoreline Resiliency Incentive Funding Program - Virginia Revolving Loan Fund Program Design and Guidelines, approved 2015

The MPPDC has a history of continuous work on flooding and coastal resiliency topics, as described in **Attachment 1**. These projects have built upon each other to establish within the MPPDC a solid foundation of regional expertise in flooding and coastal resiliency. Now, given this history of accumulated information and knowledge, the MPPDC can move beyond research and studies to begin implementing projects on the ground. One such effort, launched in 2020 following the Commission's authorization, was developed in response to emerging flood challenges. This effort, the **Middle Peninsula Fight the Flood (FTF) Program**, leverages state and federal funding to deliver flood mitigation solutions directly to constituents, for both the built and natural environments with an emphasis on nature-based flood mitigation solutions.

The Middle Peninsula **FTF** program helps property owners gain access to programs and services to better manage challenges posed by flood water. MPPDC staff have partnered with private property owners registered for the FTF program to assist them in finding funding for their shoreline.
Finally, the Flood Resiliency Plan and associated programs strive to carry out the guiding principles and goals set forth in the Virginia Coastal Resilience Master Planning Framework established in 2020. The proposed activities are proposed in accordance with the guiding principles and with the intent that their outcomes will help the Commonwealth meet the goals set forth in the planning framework.

Attachment 1: Flood Prevention Projects and its Relevance to Other Projects

MPPDC staff have worked throughout the years to understand the policy, research and impacts of flooding (i.e., stormwater, coastal, riverine, sea level rise) and coastal resiliency to the region. Below is a list of projects that have built upon each other over the year that have contributed to our understanding and the region's coastal resilience.

Climate Change & Sea Level Rise (2009 to 2012)
The MPPDC was funded for a 3 Phase project through the Virginia Coastal Zone Management Program to assess the impacts of climate and sea level rise throughout the region. With over 1,000 miles of linear shoreline, the Middle Peninsula has a substantial amount of coast under direct threat of accelerated climate change and more specifically sea-level. In Phase 1, MPPDC staff assessed the potential anthropogenic and ecological impacts of climate change. Phase 2 focused on facilitating presentations and developing educational materials about sea level rise and climate change for the public and local elected officials. Finally Phase 3 focused on developing adaptation public policies in response to the assessments.

Phase 1: Middle Peninsula Climate Change Adaptation: Facilitation of Presentations and Discussions of Climate Change Issues with Local Elected Officials and the General Public
Phase 2: Climate Change III: Initiating Adaptation Public Policy Development
Phase 3: Phase 3 Climate Change: Initiating Adaptation Public Policy Development

Emergency Management - Hazard Mitigation Planning (2009 to Present): Since 2009, the Middle Peninsula Planning District Commission has assisted regional localities in meeting the federal mandate to have an adopted local hazard plan. *The Regional All Hazards Mitigation Plan addresses the natural hazards prone to the region, including hurricanes, winter storms, tornadoes, coastal flooding, coastal/shoreline erosion, sea level rise, winter storms, wildfire, riverine flooding, wind, dam failures, drought, lightning, and earthquakes. This plan also consists of a HAZUS assessment of hurricane wind, sea level rise* (i.e., Mean High Higher Water and the NOAA 2060 intermediate-high scenario), *and flooding (coastal and riverine flooding) that estimates losses from each hazard.* The Middle Peninsula All-Hazard Mitigation Plan was updated and approved by FEMA in April 2021.

Land and Water Quality Protection (2014): In light of changing Federal and State regulations associated with Bay clean up-nutrient loading, nutrient goals, clean water, OSDS management, storm water management, TMDLs, etc., staff from the Middle Peninsula Planning District Commission (MPPDC) will develop a rural pilot project which aims to identify pressing coastal issue(s) of local concern related to Bay clean up and new federal and state legislation which ultimately will necessitate local action and local policy development. Staff has identified many cumulative and secondary impacts that have not been researched or discussed within a local public policy venue. Year 1-3 will include the identification of key

concerns related to coastal land use management/water quality and Onsite Sewage Disposal System (OSDS) and community system deployment. Staff will focus on solution based approaches, such as the establishment of a regional sanitary sewer district to manage the temporal deployment of nutrient replacement technology for installed OSDS systems, assessment of land use classifications and taxation implications associated with new state regulations which make all coastal lands developable regardless of environmental conditions; use of aquaculture and other innovative approaches such as nutrient loading offset strategies and economic development drivers.

Department of Conservation and Recreation Stormwater Management (2014)
The Virginia General Assembly created a statewide, comprehensive stormwater management program related to construction and post-construction activities (HB1065 - Stormwater Integration). The Virginia Department of Conservation and Recreation requires stormwater management for projects with land disturbances of one acre or more. This new state mandate requires all Virginia communities to adopt and implement stormwater management programs by July 1, 2014, in conjunction with existing erosion and sediment control programs. Additionally, the communities within the MPPDC are required to address stormwater quality as stipulated by the Chesapeake Bay TMDL Phase II Watershed Implementation Plan and the Virginia Stormwater Regulations. The MPPDC Stormwater Program helped localities develop tools specific to the region necessary to respond to the state mandate requirement for the development of successful stormwater programs.

Stormwater Management-Phase II (2014): MPPDC staff and Draper Aden Associates worked with localities (i.e. Middlesex, King William, and Mathews Counties and the Town of West Point) interested in participating in a Regional Stormwater Management Program. While each locality sought different services from the regional program, this project coordinated efforts, developed regional policies and procedures, and the proper tools to implement a regional VSMP.

Mathews County Rural Ditch Enhancement Study (2015): In contract with Draper Aden Associates, a comprehensive engineering study was developed to provide recommendations and conceptual opinions of probable costs to improve the conveyance of stormwater and water quality through the ditches in Mathews County.

Drainage and Roadside Ditching Authority (2015): This report explored the enabling mechanism in which a Regional Drainage and Roadside Ditching Authority could be developed. An Authority would be responsible for prioritizing ditch improvement needs, partnering with Virginia Department of Transportation (VDOT) to leverage available funding, and ultimately working toward improving the functionality of the region's stormwater conveyance system.

Living Shoreline Incentive Program (2016 to present):
In 2011 Virginia legislation was passed designating living shorelines as the preferred alternative for stabilizing Virginia tidal floodplain shorelines. The Virginia Marine Resources Commission, in cooperation with the Virginia Department of Conservation and Recreation and with technical assistance from the Virginia Institute of Marine Science (VIMS), established and implemented a general permit regulation that authorizes and encourages the use of living shorelines however, no financial incentives were put in place to encourage consumers to choose living shorelines over traditional hardening projects in the Commonwealth. To fill this need the MPPDC developed the MPPDC Living Shoreline Incentives Program to offer loans and/or grants to private property owners interested in installing living shorelines to stabilize their shoreline. Living Shoreline loan funding is available to waterfront homeowners with financing living shorelines, permitted by the Virginis Marine Resources Commission. Loans up to

$10,000 can be financed for up to 5 years (60 months). Loans over $10,000 can be financed for up to 10 years (120 months). Loans up to $10,000 can be financed for up to 5 years (60 months). Loans over $10,000 can be financed for up to 10 years (120 months). Loans over $35,000 have the option of financing up to 120 months. Interest is at 50% the published Wall Street Journal Prime rate on the date of loan application. Minimum loan amount is $1,000. Maximum determined by income and ability to repay the loan. Limited loan forgiveness is available for qualified applicants. Since 2016 under the MPPDC Living Shoreline Revolving Loan program, ~~8~~ 10 living shorelines have been financed and built encumbering over $800,000 in VRA loan funding and ~400,000 in NFWF grant funding. Living Shoreline construction cost to date range per job $14,000- $180,000. MPPDC oversees all aspects (planning, financing, construction, and loan servicing) of these projects from cradle to grave.

Mathews County Ditch Project - VCPC White Papers (2017): This report investigated the challenges presented by the current issues surrounding the drainage ditch network of Mathews County. The study summarized research conducted in the field; examined the law and problems surrounding the drainage ditches; and proposed some next steps and possible solutions.

Mathews County Ditch Mapping and Database Final Report (2017): This project investigated roadside ditch issues in Mathews County through mapping and research of property deeds to document ownership of ditches and outfalls. This aided in understanding the needed maintenance of failing ditches and the design of a framework for a database to house information on failing ditches to assist in the prioritization of maintenance needs.

Virginia Stormwater Nuisance Law Guidance (2018): This report was developed by the Virginia Coastal Policy Center to understand the ability of a downstream recipient of stormwater flooding to bring a claim under Virginia law against an upstream party, particularly a nuisance claim. The report summarizes how Virginia courts determine stormwater flooding liability between two private parties.

Oyster Bag Sill Construction and Monitoring at Two Sites in Chesapeake Bay (2018): VIMS Shoreline Studies Program worked with the PAA to (1) install oyster bag sills as shore protection at two PAA sites with the goal of determining effective construction techniques and placement guidelines for Chesapeake Bay shorelines and (2) assess the effectiveness for shore protection with oyster bags on private property through time.

Fight the Flood Program (2020 to present): The Fight the Flood was launched in 2020 to connect property owners to contractors who can help them protect their property from rising flood waters. FTF also offers a variety of financial tools to fund these projects including but limited to the Septic Repair revolving loan program, Living Shoreline incentives revolving loan fund program, and plant insurance for living shorelines. Since the beginning of the program FTF has invested $27,134,713 in flood protection to the Middle Peninsula Localities.

County of Mathews Administration Office
mathewscountyva.gov

Lewis L Lawrence, Executive Director
Middle Peninsula Planning District Commission
P.O. Box 286
Saluda, Va 23149

RE: Applications Submitted by MPPDC to Virginia Community Flood Preparedness Fund ROUND 4

Dear Lewie,

Mathews County supports all eligible applications requesting funding under the Department of Conservation and Recreation (DCR)'s Community Flood Preparedness Fund (CFPF). This proposal submitted by MPPDC staff enhances and builds upon regional and local resilience efforts within the Middle Peninsula.
We further support project proposals that demonstrate a primary purpose of prevention or protection to reduce coastal, riverine, or inland flooding. The MPPDC Fight the Flood (FTF) Program serves as the region's flood resiliency coordination program. The MPPDC Living Shoreline Incentive Program design and the MPPDC FTF Program design provide operational and administrative oversite for resiliency planning, coordination, and implementation. These programs, especially MPPDC FTF program, recognize the inherent risk to the delivery of essential governmental services, including public safety, posed by coastal storms and recurrent flooding of all types and the relationship between at-risk waterfront real estate values and funding of essential governmental services.

In addition to regional support, if applicable, Mathews County plans to provide the required matching funds as needed.

Should you have any questions concerning our support for the work of the MPPDC, I can be reached at rwilson@mathewscountyva.gov or (804)725-4010.

Sincerely,

Ramona Wilson, PE, MPA
Mathews County Administrator

GLOUCESTER COUNTY
County Administration
6489 Main Street
Gloucester, VA 23061
(804) 693-4042
www.gloucesterva.gov

November 8, 2023

Lewis L Lawrence, Executive Director
Middle Peninsula Planning District Commission
P.O. Box 286
Saluda, Va 23149

RE: Applications Submitted by MPPDC to Virginia Community Flood Preparedness Fund ROUND 4

Dear Lewie,

Gloucester County supports all eligible applications requesting funding under the Department of Conservation and Recreation (DCR)'s Community Flood Preparedness Fund (CFPF). The proposal submitted by MPPDC staff enhances and builds upon regional and local resilience efforts within the Middle Peninsula. We further support project proposals that demonstrate a primary purpose of prevention or protection to reduce coastal, riverine, or inland flooding. The MPPDC Fight the Flood (FTF) Program serves as the region's flood resiliency coordination program. The MPPDC Living Shoreline Incentive Program design and the MPPDC FTF Program design provide the operational and administrative oversite for resiliency planning, coordination, and implementation. These programs, especially MPPDC FTF program, recognize the inherent risk to the delivery of essential governmental services, including public safety, posed by coastal storms and recurrent flooding of all types and the relationship between at-risk waterfront real estate values and funding of essential governmental services.

Gloucester Point Beach Park is the only public beach access in the County. In addition to beach access, the park also supports boating and fishing recreational activities. This project will protect the park through natural flood mitigation and will ultimately ensure the economic, social, and environmental resilience of this location.

In addition to regional support, Gloucester County will provide the required matching funds as needed.

Should you have any questions concerning our support for the work of the MPPDC, I can be reached at 804-693-4042.

Sincerely,

Carol E. Steele
County Administrator

Budget Narrative- Required for All Categories

Each application must include a detailed Budget Narrative explaining all proposed expenditures. A budget narrative is applicable to requests from any category of grants in this manual. **Applicants must submit a budget narrative via the WebGrants Portal.**

The following items must be included in the Budget Narrative:
***Estimated total project cost*:** This amount must reflect the total cost of bringing the project to completion. Estimates for all work to be completed by third parties (engineers, contractors, etc.) on the specified project should be included. If multiple project types are selected, a detailed breakdown of how the funding is proposed to be allocated must be included for each selected project type.

Based upon the identified scope of work the total estimated project cost is $1,00,000. A match waiver is being requested; however, the MPPDC is offering an additional $176,471 of value in MPPDC living shoreline loan funds as leveraged match against this total request. The total request includes the following estimated costs:

MPPDC new hire for Fight the Flood Program Administrator: $237,753 for three years (including $145,000 Salary; $38,382 Fringe; $54,371 Indirect).

Description – The FTF Program Administrator will be responsible for financial and progress reporting and overall project management of the project. In addition to coordination with and oversight of project subcontractors, the FTF Program Administrator will be working directly with citizens seeking to participate in the Low-Income Area Parametric Insurance Accelerator program as well as overseeing the administration of MPPDC Living Shoreline loans within the project area which are being offered as match towards the grant funded project.

MPPDC Fringe pool for full time (FT) employees includes health insurance, retirement, group life insurance, workman's comp and unemployment insurance. MPPDC FT employee planned fringe rate for FY24 is 26.47% comprised of: Health Insurance – 12.88%, Retirement – 4.79%, Workers Comp – 0.09%, Social Security –7.52%, Life Insurance – 1.18%, Unemployment – 0.01%. MPPDC Fringe pool for PT employees includes: Workers Comp, Social Security, and Unemployment Insurance. MPPDC par time employee planned fringe rate for FY24 is 7.65%.

MPPDC prepares an indirect cost plan annually per 2 CFR 200 Appendix VII. Following annual audit, the plan is submitted to our Cognizant Federal Agency for acceptance. MPPDC's IDC rate has a basis of Modified Total Direct Costs, with a FY24 planned rate of 29.65%.

MPPDC Legal Counsel for Procurement and Contracting: $5,000

Description: MPPDC Legal will prepare procurement and contract documents critical to subcontracts and the overall project efficiency.

Flood and Parametric Insurance Consultant: $245,000 for three years (including up to $240,000 salary and $5,000 mileage for necessary travel for property site visits).

Description – A subcontract with a qualified and experienced Insurance Consultant will be procured following VPPA requirements. The consultant will coordinate directly with Fight the Flood participants who have indicated that they are interested in learning more about flood insurance or have indicated that they need consultation on existing policies. As a new service under the FTF Program, participants will now have access to expert advice and guidance at no cost. The Consultant

will advise on how new and existing policies can be structured or restructured to optimize overall flood protection while providing much needed savings via lower or reduced policy premium costs. There are an ample number of currently registered FTF participants indicating insurance needs to ensure the Consultant will remain busy for at least 1 to 2 years. It is important to note that the MPPDC has been very hesitant to promote via paid marketing the FTF program to date due to staffing capacity restrictions and that the vast majority if not all of current FTF participants are finding the site on their own or via local word of mouth. This new service will be promoted via all FTF outreach avenues including local print media and online digital media (see Consociate subcontract below) to ensure ample participation and since this will be the first time a free insurance advisory service will have been offered via the FTF program, it is anticipated that there will be an extremely high level of demand for this service. The Insurance Consultant will also coordinate directly with parametric insurance companies as necessary to oversee efficient and effective launch of new parametric insurance offerings once the new gauges have been deployed and brought online. The anticipated outcomes will be new and improved individual flood insurance policies which is a primary strategy of the MPPDC Resilience Plan and a critical solution for enhancing the region's overall coastal resilience.

Consociate Media for development of new flood insurance educational materials and promotion of new services and products available via the Fight the Flood Program: $10,000

Description: Local media firm, Consociate Media, has served as the outreach, marketing, and educational service provider for MPPDC programs for many years and is well versed in effectively communicating with local citizens regarding flood protection, resiliency and the overall FTF program. Consociate will be contracted to develop educational videos and other digital materials regarding flood and parametric insurance, their benefits, technical matters regarding attaining policies, and how to utilize the FTF program to access educational materials and tangible services. Consociate will use both local printed media, targeted promotions and outreach using geofencing to high priority and flood prone areas within the Middle Peninsula, and incorporation of materials onto the FTF website. In addition to general education and outreach, Consociate will promote the services available via the new Flood Insurance Consultant as well as the opportunity for citizens to apply for and participate in the MPPDC Low-Income Area Parametric Insurance Accelerator program.

MPPDC Low-Income Area Parametric Insurance Accelerator Program: $182,974

Description: MPPDC will promote and solicit applications from designated low-income areas within the Mobjack Bay watershed for individual one-year parametric insurance policies on a first-come, first-served basis as funding allows. This will be done most likely during Year 3 of the project once the new gauges have been deployed and the parametric insurance providers have activated the Mobjack Bay area by offering new policies. The FTF Program Administrator will assist applicants and coordinate with those selected to receive the free policies through the accelerator program. Participants will be required to provide access to general information regarding their policies including but not limited to coverage amounts, items covered, and premium amounts and this information will be utilized by the Insurance Consultant to better understand the affordability of premium costs and be able to coordinate with parametric insurance providers regarding strategies for what can be done to ensure affordability for the greatest number of citizens as possible. These lessons learned will inform the MPPDC, VIMS, and the state how best to structure tide gauge networks to drive parametric insurance premiums to affordable levels for low-income citizens in particular.

Virginia Institute of Marine Science (VIMS) for gauge network planning and coordination and purchase, deployment and maintenance of tide gauges and other related grant activities: $319,273

Description – VIMS staff will coordinate a planning work group consisting of New Paradigm Underwriters, MPPDC staff, the FTF Insurance Consultant, and others as necessary to finalize strategies for determining policy trigger levels, the Mobjack Bay service area, and optimal locations of existing and new gauges. VIMS will compile historic data to support the planning process. VIMS will purchase and deploy six new sensors/gauges and 3 backup sensors/gauges around the Mobjack Bay watershed on publicly owned infrastructure. This will involve updating telemetry equipment related to existing sensors, conducting site surveys, calibration, maintenance (over the duration of the DCR funded project. VIMS will assume maintenance responsibilities once the grant funded project is complete), and closed data management for each new sensor. VIMS will communicate and conduct educational outreach to communities regarding new sensor installation, publicize work at local and regional flood adaptation forums, calibrate the Tidewatch tidal prediction model with the new sensor data, and support other grant related activities as necessary.

VIMS Sensor Hardware Costs - The cost to purchase a solar-powered Ka-band radar water level monitoring station with real-time Iridium satellite data transmission capabilities necessary as an input for parametric insurance models is approximately ~$16,500/each to purchase. The estimated cost is $16,500/sensor for a total of $148,500 for the purchase of 6 sensors, and 3 backups. In addition, telemetry equipment to enhance the three sensors managed by CBNERR-VA in the York River, for integration into the Tidewatch Network is expected to total: $16,500.

VIMS Installation, Maintenance, and Operation Costs - Newport News found that installation costs using their own Public Works department ranged based upon the installation type and fabrication required (bridge-rail mounted ~$2,600/each; separate pole-mounted ~$3,500/each). Virginia Beach hired a nationwide engineering contractor, Oceaneering, with a local office based in Chesapeake, VA to install, survey, and vertically calibrate the sensors to the tune of ~$4,200/each. This can be estimated to be an average of ~$3,000. Monthly Operation Costs: sensors communicate via Iridium satellite uplink and vary based upon monthly Iridium data transmission costs. The GreenStream Cloud also carries a nominal monthly fee per sensor to support public data streaming via a designated URL in a variety of interoperable data formats (including JSON, CSV, XML, and RSS), data management, and customizable virtual alarms to notify local government employees or emergency managers when observed water levels are high, or designated contractors when battery levels are low, or when sensors aren't reporting correctly, at a current cost of $12/sensor/mo. After the period of this project concludes, it is the intent that these costs will be solely furnished by VIMS where the new sensors are installed. Should localities determine that cost sharing is of local benefit, new payment structures can be adopted, and are to be revaluated on a regular basis. In summary, the sensors are likely to cost ~$3,000 in year one for installation, plus ~$12/sensor/month (~$144/sensor/year) for data transmission and management, and ~$500/sensor/year for maintenance and upkeep during year one and every year thereafter ~$3,644/sensor during year one, and ~$644/sensor to maintain each year thereafter; totaling $29,592 for 6 sensors over three years. In addition, funds sought to supplement VIMS-related travel and vessels to/from sensor sites, amount to $3,900.

VIMS Sensors' Vertical and Tidal Calibration, Research, and Data Integration Costs - Dr. Loftis at VIMS works with GreenStream to vertically calibrate each sensor's reported 4-20mA values (as distances to the water's surface) and convert them using the survey crews' elevation benchmark measurements to water levels above NAVD88. These data are then passed from GreenStream's cloud environment via a public Application Programming Interface (API) to Tidewatch with the assistance of Dr. Forrest at VIMS for public data ingestion and analysis for extraction of tidal harmonics (over a minimum of a 90-day period), to begin tidal forecasting at the newly gauged sites. Dr. Loftis' efforts on this project will amount to .5 mo/year, at a rate beginning at $8,219; Dr. Forrest's time equates to .75 mo/year beginning at a rate of $8,286; a 40% fringe rate in addition to these salaries is requested. In addition, salary is sought for Scott Lerberg of CBNERR-VA at a rate beginning with $6300 for 0.5 months/year to assist with data provision and telemetry and continued maintenance of CBNERR-VA sensors; 40% fringe would be applied in addition.

VIMS Facility & Administrative Costs – VIMS indirect costs are calculated at VIMS' federally negotiated rate of 52.4% of modified total direct costs (MTDC). These rates are per VIMS' negotiated rate agreement with the Office of Naval research dated June 28, 2023.

***Amount of funds requested from the Fund*:** This is the total amount of any grant assistance sought from the Fund. Include a detailed breakdown of how this funding is proposed to be allocated. At a minimum this should include a breakdown of salaries, including any position requested, position title, 100 percent of salary amount and percent directly dedicated to grant activity fringe benefits, travel, equipment, supplies, construction, contracts, and any other direct costs. The budget narrative must include details and costs for each budget category sufficient to determine reasonableness and allowability.

The total amount of requested grant assistance is $1,000,000 as the project is being conducted and is intended to serve the Mobjack Bay watershed, of which the vast majority is comprised of areas meeting the DCR definition of "low-income geographic area" (see Figure 3 in Scope of Work).

Indirect costs are not eligible for funding. Salaries of existing staff are ineligible; however, salaries of staff who provide direct and documented support to the grant effort may be considered as match. Please refer to the match requirements in Part III of this manual. For local governments designated as low-income geographic areas, 100 percent of the estimated total project costs should be included.

***Amount of funds available*:** This amount, when combined with the amount of funding requested from the Fund, must reflect the total estimated project cost to demonstrate that all necessary funding has been secured to complete the project. Include a description of the source of these funds and evidence of the applicant's ability to obtain these funds to complete the project.

$1,000,000 of DCR grant funds are being requested and a match waiver is being requested for this project serving low-income areas. MPPDC is offering an additional $176,471 of value in MPPDC living shoreline loan funds utilized for constructing living shorelines in the Mobjack Bay as leveraged match against this total request. The total estimated project cost is $1,176,471. The MPPDC match commitment and authorization letter has been uploaded to the grants portal.

Authorization to request for funding: Local governments seeking funding shall also attach signed documentation authorizing the request for funding.

Th authorization to request funding has been uploaded to the grants portal.

Applicant Name: Middle Peninsula Planning District Commission
Community Flood Preparedness Fund &
Resilient Virginia Revolving Loan Fund
Detailed Budget Narrative
Period of Performance: January 2024 (or upon receipt of award contract) through December 31, 2026 (or three years from date of award contract execution)
Submission Date: November 10, 2023

Grand Total State Funding Request	$1,000,000
Grand Total Local Share of Project	$176,471***
Federal Funding (if applicable)	$0
Project Grand Total	$1,176,471***
Locality Cost Match	15%***
***Match Waiver Requested	

Breakout By Cost Type	Personnel	Fringe	Travel	Equipment	Supplies	Contracts	Indirect Costs	Other Costs	Total
Federal Share (if applicable)	$0	$0	$0	$0	$0	$0	$0	$0	$0
Local Share	$0	$0	$0	$0	$0	$0	$0	$176,471***	$176,471***
State Share	$145,000	$38,382	$0	$0	$0	$762,247	$54,371	$0	$1,000,000
Pre-Award/Startup	$0	$0	$0	$0	$0	$0	$0	$0	$0
Maintenance	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	$145,000	$38,382	$0	$0	$0	$762,247	$54,371	$176,471***	$1,176,471***

Application Form for Grant and Loan Requests for All Categories

Virginia Department of Conservation and Recreation
Virginia Community Flood Preparedness Fund Grant Program

A. ORGANIZATIONAL INFORMATION

Name of Local Government: Middle Peninsula Planning District Commission

Category Being Applied for (check one):

☐ Capacity Building/Planning
☒ Project
☐ Study

NFIP/DCR Community Identification Number (CID)____510071/ 510096

Name of Authorized Official and Title: Lewis Lawrence, Executive Director

Signature of Authorized Official: _____
Mailing Address (1): PO Box 286
Mailing Address (2): 125 Bowden Street
City: Saluda **State:** VA **Zip:** 23149
Telephone Number: (804) 758-2311 **Cell Phone Number:** (____) _____
Email Address: llawrence@mppdc.com

Contact Person (If different from authorized official): Jackie Rickards
Mailing Address (1): PO Box 286
Mailing Address (2): 125 Bowden Street
City: Saluda **State:** VA **Zip:** 23149
Telephone Number: (804) 758-2311 **Cell Phone Number:** _____
Email Address: jrickards@mppdc.com

Is the proposal in this application intended to benefit a low-income geographic area as defined in the Part 1 Definitions? Yes _X___ No ____

Project Grants and Loans (Check All that Apply – Hybrid Solutions will include items from both the "Nature-Based" and "Other" categories)

Nature-based solutions

☐ Acquisition of property (or interests therein) and/or structures for purposes of allowing floodwater inundation, strategic retreat of existing land uses from areas vulnerable to flooding; the conservation or enhancement of natural flood resilience resources; or

acquisition of structures, provided the acquired property will be protected in perpetuity from further development, and where the flood mitigation benefits will be achieved as a part of the same project as the property acquisition.

- ☐ Wetland restoration.
- ☐ Floodplain restoration.
- ☐ Construction of swales and settling ponds.
- ☐ Living shorelines and vegetated buffers.
- ☐ Permanent conservation of undeveloped lands identified as having flood resilience value by *ConserveVirginia* Floodplain and Flooding Resilience layer or a similar data driven analytic tool, or the acquisition of developed land for future conservation.
- ☐ Dam removal.
- ☐ Stream bank restoration or stabilization.
- ☐ Restoration of floodplains to natural and beneficial function.

Other Projects

- ☐ Structural floodwalls, levees, berms, flood gates, structural conveyances.
- ☐ Storm water system upgrades.
- ☐ Medium and large-scale Low Impact Development (LID) in urban areas.
- ☐ Developing flood warning and response systems, which may include gauge installation, to notify residents of potential emergency flooding events.
- ☐ Dam restoration.
- ☐ Beneficial reuse of dredge materials for flood mitigation purposes
- ☐ Removal or relocation of structures from flood-prone areas where the land will not be returned to open space.
- ☐ Acquisition of property (or interests therein) and/or structures for purposes of allowing floodwater inundation, strategic retreat of existing land uses from areas vulnerable to flooding; the conservation or enhancement of natural flood resilience resources; or acquisition of structures, provided the acquired property will be protected in perpetuity from further development, and where the flood mitigation benefits will **not be** achieved as a part of the same project as the property acquisition.

X Other project identified in a DCR-approved Resilience Plan.

Location of Project or Activity (Include Maps): The counties of Essex, Gloucester, King and Queen, King William, Mathews, and Middlesex and the incorporated towns of Tappahannock, Urbanna, and West Point. Elements of the project are focused solely on the Mobjack Bay area within Gloucester and Mathews Counties.

NFIP Community Identification Number (CID#) : Gloucester (510071) and Mathews (510096)

Is Project Located in an NFIP Participating Community? X Yes □ No

Is Project Located in a Special Flood Hazard Area? **X** Yes □ No

Flood Zone(s) (If Applicable): All flood zones will be targeted and benefit from the proposed activities
Flood Insurance Rate Map Number(s) (If Applicable): All FIRMs in the Middle Peninsula Localities

Total Cost of Project: $1,176,471

Total Amount Requested: $1,000,000

Amount Requested as Grant: $1,000,000

For projects, planning, capacity building, and studies in low-income geographic areas: Are you requesting that match be waived? X Yes □ No

B. SCOPE OF WORK NARRATIVE

General Requirements

1. Needs and problems:
    a. Specific problem being solved (not just that flooding exists or may occur in the future).

The Middle Peninsula and in particular the Mobjack Bay suffer from one of the highest rates of sea-level rise on the eastern seaboard. With this risk comes assets not currently insurable by FEMA Flood Insurance or Homeowners Insurance.

The first goal of the proposal will be done in partnership with the Virginia Institute of Marine Science, whose staff will design and deploy a network of tide gauges in the Mobjack Bay, an area designated as low income under the Flood Fund metrics, to allow for parametric insurance to be offered to insure uninsurable assets currently at risk along the waterfront, assets such as engineered septic systems (system costs $25,000-$70,000) and living shorelines (costs running $20,000- $750,000). These assets are in many cases publicly funded for protection or public health, but no insurance exists to insure assets against the threat posed by recurrent storm damage. Parametric insurance offers financial protection against losses that are often hard, or even impossible, to get insurance for, except in a nontraditional insurance structure. Traditional indemnity insurance pays out based on the cost of the loss incurred. Parametric insurance pays out when a predefined loss event occurs, and the loss event exceeds a specific dollar or index amount that was pre-agreed to in the policy. Examples of perils covered, and typical triggers include hurricane (wind speed), flood (height), earthquake (shake intensity), pandemic (number of infections). Advantages to an insured are that because the insurer knows how much the policy is going to pay out before the loss, claims are settled virtually immediately, and the insured gets paid out quickly. If the insured has the coverage and the flood is at their premises, then the policy will payout, regardless of if there was actual damage, so the insured knows they will receive a payout once the water level reaches the established threshold. The insurer knows exactly how many policies will be affected by a given flood, eliminating uncertainty. Therefore, the policies are less expensive to the insured, and the insurer has greater predictability of losses and can set rates accordingly. The first objective for the first goal of the proposed project will be to launch the needed gauge network for parametric insurance providers to begin

offering policies in the Mobjack Bay watershed in a manner where the project can serve as a pilot by providing lessons learned so that additional coverage can be rolled out across the Commonwealth over time. The second objective of Goal 1 is to launch the FTF Low-Income Parametric Insurance Accelerator Program, which will serve as an innovative effort to purchase parametric insurance during the period of the grant award to provide low-income citizens within the newly created service area in Mobjack Bay immediate insurance coverage to help the most socioeconomically vulnerable property owners be able to attain and afford parametric insurance. A media firm will be contracted to promote and solicit participation in the program and funding will be used to hire a new MPPDC FTF Program Administrator position who will process program applications and oversee the issuance of policies on a first come, first served basis until the awarded funds for the effort are expended. Participants will be required to provide access to general information regarding their policies including but not limited to coverage amounts, items covered, and premium amounts and this information will be utilized by the Insurance Consultant to better understand the affordability of premium costs and be able to coordinate with parametric insurance providers regarding strategies for what can be done to ensure affordability for the greatest number of citizens as possible. These lessons learned will inform the MPPDC, VIMS, and the state how best to structure tide gauge networks to drive parametric insurance premiums to affordable levels for low-income citizens in particular.

The second goal of the project is to enhance and advance effective flood resilience in the Middle Peninsula by utilizing the MPPDC Fight the Flood (FTF) program to offer flood insurance policy reviews and strategies for making flood insurance more affordable for local property owners. MPPDC will procure a Flood Insurance consultant who will work one on one with FTF participants to advise them how best to structure new flood insurance policies and how best to restructure existing policies in a manner which lowers premium costs and allows for greater and more widespread flood insurance coverage, thereby enhancing the region's overall resilience to flooding events. Additionally, a media firm will be contracted to develop educational and outreach materials to help enhance property owner's general understanding of flood insurance and to promote this new FTF service available at no cost to local constituents.

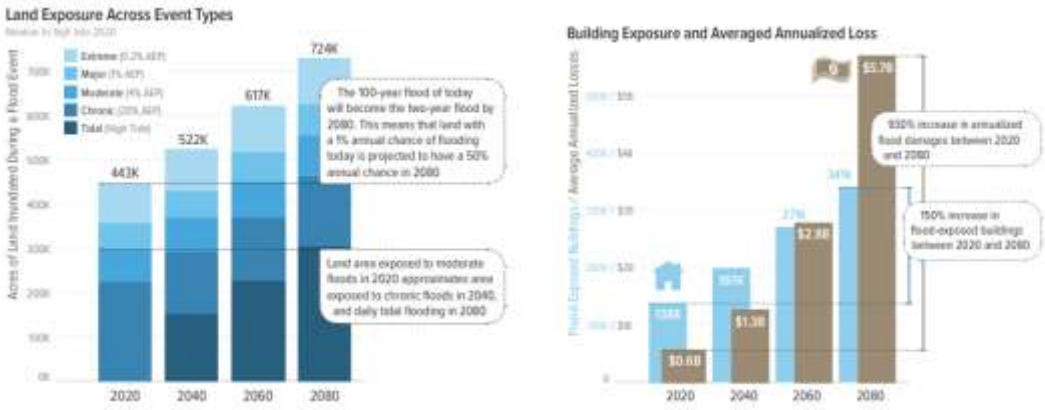
b. Factors which contribute to the identified problem.

More insurance companies are pulling out of states deemed a "high climate risk." AAA and Farmers Insurance are the latest companies to pull out of some coastal states. Meanwhile, State Farm and Allstate have stopped accepting new home insurance policies in some states. According to the Virginia Coastal Resilience Master Plan, the Middle Peninsula is the epicenter of risk.

Land Acres Exposed		2020	2080	Change
Accomack-Northampton PDC	High tide	90,300	176,200	+ 95%
	Extreme flood	206,600	238,700	+ 16%
Northern Neck PDC	High tide	9,400	30,000	+ 219%
	Extreme flood	37,200	63,700	+ 71%
Middle Peninsula PDC	High tide	25,500	76,200	+ 199%
	Extreme flood	102,600	140,500	+ 37%

Buildings Exposed		2020	2080	Change
Accomack-Northampton PDC	High tide	100	6,700	+ 6173%
	Extreme flood	8,500	10,600	+ 25%
Northern Neck PDC	High tide	130	1,900	+ 1444%
	Extreme flood	3,000	7,700	+ 155%
Middle Peninsula PDC	High tide	120	5,900	+ 4796%
	Extreme flood	10,100	15,400	+ 52%

Differences in asset exposure numbers and percentage changes can be attributed to rounding for presentation. Percentage changes reflect exact exposure numbers.



c. Why the project is needed either locally or regionally.

At risk assets generate taxable revenue which funds local government programs. Without insurance coverage to mitigate financial risk and loss, the underpinning of the rural coastal tax base is placed at risk. Elected officials within the MPPDC have directed staff to develop programs and services to protect the tax base for a clear and present danger. The proposed activities represent a key step towards advancing the overall resilience of the Middle Peninsula, but also represents key advancements towards achieving resilience related goals in several state planning efforts.

d. How the project decreases the risk to public safety through flood risk reduction.

Parametric insurance exists to resolve the drawbacks and the hard market of traditional insurance, which is existing coastal communities. Parametric insurance is designed to provide bespoke contracts which are tailor made to fit specific needs, simplify the pay-out process, optimize costs, and build resilience, especially on hard-to-assess intangibles such as business interruption.

Additionally, the project will offer needed additional education with regards to flood and parametric insurance, offer innovative programming which provides free parametric insurance for the most socioeconomically vulnerable citizens and free flood insurance consultation and advising, and improves the overall flood resiliency of the region and Commonwealth through additional insurance coverage, which in turn is critical to preserving the local rural coastal tax base which is essential to the MPPDC local governments' ability to be able to fund essential local government services against the challenge of recurrent flooding and sea-level rise.

e. How the project protects or conserves natural resources.

Parametric Insurance will allow homeowners to insure nature-based flood mitigation assets, such as living shorelines, which are currently uninsurable. The Mobjack Bay parametric insurance pilot will inform other similar efforts in the future around the Commonwealth and sets the stage for insuring of nature-based solutions at a greater scale throughout the Commonwealth.

f. Who is protected.

All who need insurance within Gloucester and Mathews Counties residing within the insurable area will be able to avail themselves of the new parametric insurance coverage. This proposal also proposes to purchase parametric policies for the period of the grant

award to provide low-income citizens immediate insurance coverage under a new program termed: Low-Income Parametric Insurance Accelerator. All property owners within the Middle Peninsula will receive new educational materials through targeted and regional outreach efforts utilizing the FTF program. The new tide gauge data will be utilized to enhance forecasting within the VIMS Tidewatch program. This information is publicly available and the FTF program will be utilized to raise awareness and increase the use of the forecasting tool locally.

g. The safety threats, or environmental concerns related to flood risk.

Water does not discriminate, flooding problems impact the rich and the poor universally, harming the built and the natural environment equally. Without having parametric insurance available as is the case currently in the Commonwealth, critical public health hazards, such as septic systems and environmentally beneficial living shorelines will remain uninsured. This means that property owners will need to pay out of pocket to rebuild or repair these assets in the event of storm damage and many citizens in coastal Virginia do not have the means to rebuild or repair to return the assets to their intended level of functionality. This constitutes one of the greatest threats from flooding and sea-level rise to public health and environmental quality facing the Commonwealth. This proposal represents a transformational first step for the Middle Peninsula and the Commonwealth to begin addressing these great threats to overall resilience.

h. Groups to be targeted who might directly benefit from this flood risk reduction effort.

According to the Virginia Coastal Resilience Master Plan, the Middle Peninsula is the epicenter of risk. Those targeted for insurance will be the owners owning land and buildings within the insurable area of the Middle Peninsula. Citizens from low-income areas within the Mobjack Bay parametric insurance service area will be targeted with opportunities for free parametric insurance policies. All citizens will be availed of new and free flood insurance consultation. All citizens will be targeted with insurance education materials and have access to enhanced Tidewatch flood forecasting technologies.

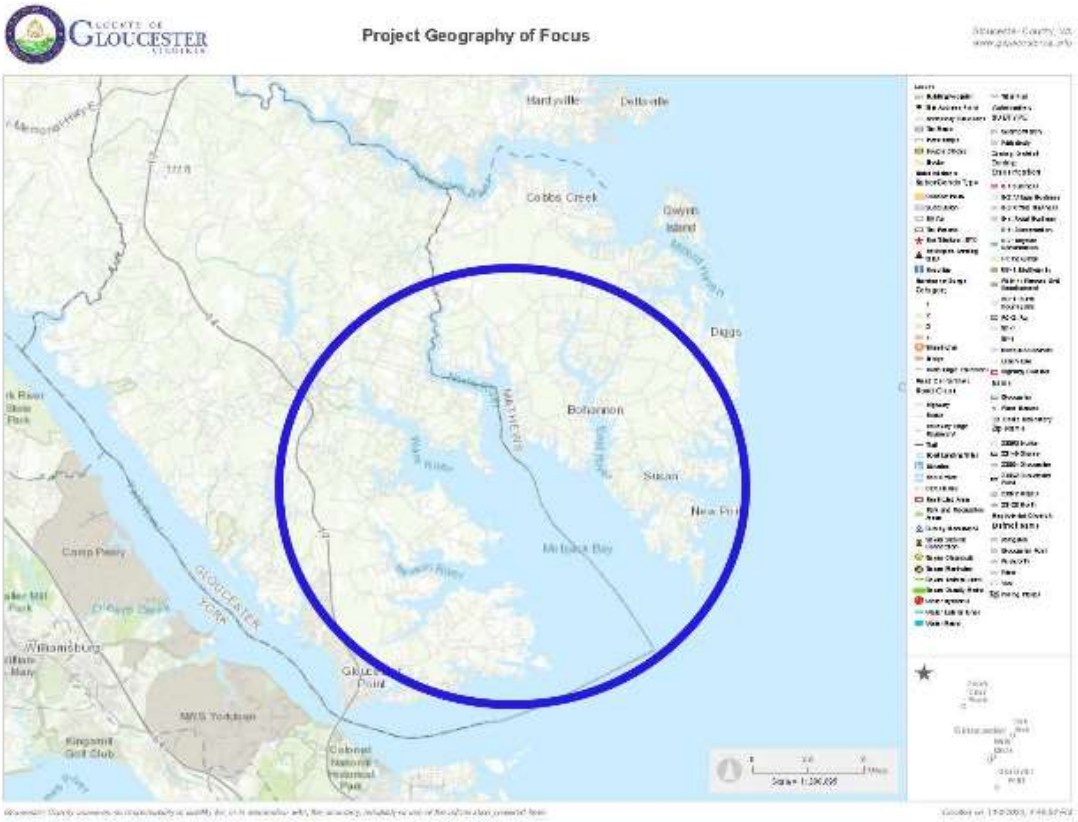
Land Acres Exposed		2020	2080	Change
Accomack-Northampton PDC	High tide	90,300	176,200	+ 95%
	Extreme flood	206,600	238,700	+ 16%
Northern Neck PDC	High tide	9,400	30,000	+ 219%
	Extreme flood	37,200	63,700	+ 71%
Middle Peninsula PDC	High tide	25,500	76,200	+ 199%
	Extreme flood	102,600	140,500	+ 37%

Buildings Exposed		2020	2080	Change
Accomack-Northampton PDC	High tide	100	6,700	+ 6173%
	Extreme flood	8,500	10,600	+ 25%
Northern Neck PDC	High tide	130	1,900	+ 1444%
	Extreme flood	3,000	7,700	+ 155%
Middle Peninsula PDC	High tide	120	5,900	+ 4796%
	Extreme flood	10,100	15,400	+ 52%

Differences in asset exposure numbers and percentage changes can be attributed to rounding for presentation. Percentage changes reflect exact exposure numbers.

Interconnected social, economic and environmental characteristics are shared by Gloucester and Mathews counties, each member of the Rural Coastal Virginia Community Enhancement Authority (Code of Virginia § 15.2-7600). These characteristics include but are not limited to a low income and aging demographic, as well as increasing relative sea level contributing to flood exposure. Operating at the nexus of these adverse influences, are the residents adjacent to Mobjack Bay (**Figure 1**).

Figure 1. Project geography of focus



Located at the terminus of Virginia's Middle Peninsula, an area susceptible to flood hazard (**Figure 2**), eight Census Block Groups pertaining to two counties, Gloucester and Mathews, are home to approximately 12,156 residents. These residents share socioeconomic and demographic characteristics that reflect vulnerabilities in numerous respects (**Table 1**). According to DCR guidelines, specific areas of the Middle Peninsula region are considered a "low-income geographic area" per the DCR definition included in the 2023 Funding Manual for the Virginia Community Flood Preparedness Fund. Each county had its 'Eligible Household income' identified by using US Census data and then calculated by multiplying the County's median household income by .8. Any census geography identified under the .8 has been identified as low income. This resulted in the following numbers:

	Virginia	Essex	Middlesex	Mathews	King William	King & Queen	Gloucester
Median household income (in 2020 dollars), 2015-2019	$76,398	$51,125	$57,060	$74,489	$73,284	$65,385	$71,649
Eligible Household income	$61,118	$40,900	$45,648	$59,591	$58,627	$52,308	$57,319

Based on the finding above, two counties in Middle Peninsula fall 100% within the eligible household income criteria. The remaining census tracts, zip codes, block groups, and

opportunity zones identified as green also qualify in accordance with the DCR "low-income geographic area" definition. The eligibility map for Middle Peninsula is below **(Figure 3)** and includes a red dot indicating the proposed project's location.

Figure 3: Regional Low-Income Communities

= Low Income Communities

Environmental stressors compound these vulnerabilities and imperil community livelihoods, safety, health and well-being; in doing so, they contribute to this region's collective vulnerability to external stressors (**Figure 4**). Notably, this collective vulnerability, while serving as one indicator of adversity experienced in the region, does not accurately portray the susceptible nature of the region's most compromised community members; doing so would necessitate data collection and provision at resolutions higher than census block level.

Figure 2. Spatial extent of multiple coastal flood hazard data sets combined for geography of interest (circled), including: high tide and flooding, Federal Emergency Management Agency (FEMA) flood data, storm surge inundation for category 1, 2 and 3 hurricanes, and sea level rise scenarios for 1, 2 and 3 feet above mean higher high water (NOAA Coastal Flood Exposure Mapper, 2023).

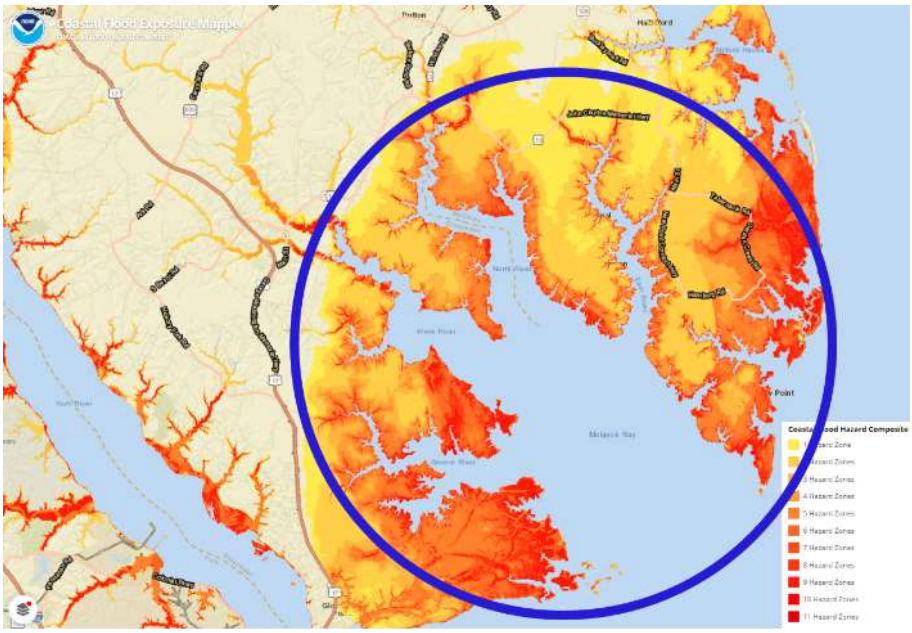


Table 1. Socioeconomic and demographic characteristics for the eight Census Block Groups adjacent to Mobjack Bay based on ACS 2021 5-Year estimates.

Census Block Group and Tract	Total Population	Total Families	% Families income in the past 12 months below poverty level:	% Households with one or more people 65 years and over:	% Population 16 years and over in the labor force	% Housing units with a mortgage:	% of households with mortgage dedicating 30% or more of income in past 12 months to mortgage
Block Group 2, Census Tract 1002.03, Gloucester County, Virginia	1,006	259	0.00%	45.52%	65.78%	61.48%	34.33%
Block Group 3, Census Tract 1002.03, Gloucester County, Virginia	892	252	12.30%	40.72%	56.39%	51.29%	16.55%
Block Group 1, Census Tract 1004, Gloucester County, Virginia	1,441	419	13.13%	49.75%	60.56%	45.63%	42.52%
Block Group 1, Census Tract 1005, Gloucester County, Virginia	4,285	1,207	7.87%	38.45%	62.08%	63.16%	32.15%
Block Group 1, Census Tract 9514.01, Mathews County, Virginia	518	158	13.29%	62.59%	52.99%	41.26%	0.00%
Block Group 2, Census Tract 9514.01, Mathews County, Virginia	1,240	282	0.00%	54.55%	44.31%	28.67%	20.80%
Block Group 3, Census Tract 9514.01, Mathews County, Virginia	326	35	0.00%	94.85%	45.72%	57.02%	23.19%
Block Group 1, Census Tract 9514.02, Mathews County, Virginia	2,448	542	15.68%	50.66%	46.68%	39.10%	37.85%

Figure 4. Mobjack Bay's eight adjacent Block Groups with social vulnerability index scores per Virginia Flood Risk Information System (VFIS).

While required for homes purchased through a federally backed mortgage, flood insurance is not required of home owners in Virginia and is unattainable for many of the Commonwealth's low income communities, including those located in the geography of focus. To encourage flood insurance purchase and lessen the impact (and deterrence) of high insurance premiums, the Middle Peninsula Planning District Commission proposes to establish the provision of parametric insurance services for residents of Mobjack Bay.

Residential parametric insurance provision, while unprecedented in the Commonwealth and initially slow to be adopted in the U.S., is increasingly being adopted by communities along coasts facing flood and adverse weather events. Distinguished from its traditional counterparts by events that trigger predetermined payouts, parametric insurance offers the insured coverage based solely on the occurrence of an event, rather than coverage for the loss incurred. Parametric insurance providers offer policies to address a variety of place-based environmental conditions; along the coast, policies often use wind and/or flooding (water level) metrics to establish the trigger events for payouts. Together, both wind (a relatively dynamic variable) and water level (a relatively static variable) indices can provide unique coverage tailored to a specific region.

i. What would happen (or not happen) if the applicant does not receive funding.

The thousands of citizens suffering will continue to see land and building values decline, loss of wealth and disinvestment. A regressive tax framework will emerge where those living in the interior will pay more in taxes to offset lost revenue. Living shorelines throughout the Mobjack Bay and the Commonwealth are currently uninsurable and represent one of the greatest resilience challenges when a major storm event strikes Virginia's coasts. The Mobjack Bay parametric insurance pilot will be the first effort in Virginia to address this challenge by providing insurance to currently uninsurable assets. If the pilot is not funded, the Middle Peninsula's Mobjack Bay area and the Commonwealth will continue to fail at stepping up to address this critical resilience need.

Without the funds sought in this proposal, VIMS would not be able to update, install and integrate the monitoring sensors as proposed. Moreover, awareness and provision of a parametric insurance option would not be afforded Mobjack Bay residents; the lack of a pilot would preclude any future transfer to other, critical areas in need within the Middle Peninsula region. While the Middle Peninsula's All Hazard Mitigation Plan outlines strategies and funding opportunities for residents and localities alike, the effort proposed herein seeks to fill a gap entirely untouched in the plan; a gap that is becoming increasingly concerning. Addressing this gap in concert with those strategies outlined in the hazard mitigation plan, through programs like Fight the Flood for instance, is at the core of this proposal – and will offer regional residents the most comprehensive planning options and recourses in the face, and wake, of adverse events.

j. Alternatives analysis of the viability of the project, how selected project reduces risk to populations at risk of flooding. Provide examples of current or previous related projects, data, outcomes etc. that justify the approach chosen. Include how long and how much protection to be achieved.

The Middle Peninsula and in particular the portion for the Mobjack Bay and associated rivers

comprise part of 3,000 NFIP FEMA Flood insurance policies with a combined coverage of more than $47,000,000. As part of this effort, Mike Vernon, CEO for Flood Mitigation Services, which is also a participating Fight the Flood business, continues to work direct with NFIP policy holder to reduce premium costs due to poorly drafted polices as well as welcomes the ability to partner with New Paradigm (www.npuins.com) bring Parametric Insurance to the Commonwealth as a pilot for at risk. There is significant risk and the financial and insurance markets are responding. Coastal Virginia must bring new insurance products to market to diversify risk and add cost efficiencies.

The MPPDC has explored parametric insurance provision for its six localities in concert with New Paradigm Underwriters (NPU). Over the past 5years, this partnership has collaborated toward feasible and marketable service provision in the region, iterating on triggers, events, and locations. The current proposal reflects the work of this partnership, in concert with the evidence-based research support and programmatic expertise of VIMS faculty and staff.

Underlying the provision of parametric insurance, is a historical understanding of triggering events in the region, in concert with continued and reliable data collection. To this end, MPPDC is partnering with VIMS to provide NPU historical data on water levels in the Mobjack region, which will be used in concert with wind data to determine flooding event triggers. Moreover, VIMS programs will update current sensors and install new tide gauge stations in an effort to both refine triggering event conditions and to ensure that the continued provision of data collection is not compromised during adverse weather events. The provision of historical data, alongside increased data collection at finer resolution in Mobjack Bay, will allow for NPU to establish policies with greater certainty of triggering event conditions and occurrences. Ultimately, this increased certainty will translate to affordable premiums for Mobjack Bay residents.

NPU will determine the specific radius of the service area following the provision of historic data; subsequent data from newly installed tide gauges will further refine service area boundaries. NPU will also determine triggers and coverage provisions based on this collective data. Together, the identified service area and coverage policies will structure a pilot program that provides parametric insurance services to Mobjack Bay residents. With grant funding, these services will be marketed to all residents in the focal geography, in large part alongside Middle Peninsula PDC's Fight the Flood effort. To encourage adoption and support the region's most underserved residents, applicants demonstrating need will receive one free year of insurance coverage – made available on a first come first served basis as funding allows. Residential buy-in for all covered parties will be assessed following one year of pilot program implementation.

Notably, the service area resulting from combined data inputs (existing and new sensors) may be larger than that of the focal geography proposed. Therein, coverage for residents outside of the Mobjack Bay area could be established with the baselines developed in this proposal, a prime next step for future iterations of the proposed program; as it stands, the coverage area of this pilot effort will be restricted to Mobjack Bay area.

Central to the continued provision of robust environmental data, is the management and maintenance of equipment, as well as stewardship of the data itself. Herein, VIMS will play a key role, providing data from existing operations while overseeing the deployment of new,

complementary sensors. Together, this network of data will provide robust analytics necessary to inform NPU's policies. Moreover, data from existing and new gauges will be ingested into the Tidewatch Network, enhancing the Commonwealth's asset as prescribed in the 2021 Coastal Resilience Master Plan:

A comprehensive coastal and riverine gauge system can give localities, planners, emergency managers, engineers, businesses and residents the tools they need to monitor and prepare themselves for changing flood risks. More and better-integrated data is critical to anticipate the severity of flood events, a growing need for coastal communities experiencing nuisance flooding, and the effects of sea level rise (page 235).

The collective monitoring efforts proposed will not only contribute to insurance structuring but will reduce risk to public safety through increased understanding and forecasting of flood risk, as well as informed planning. In recognition of the services to the Commonwealth that this data provides, VIMS is fully prepared to offer continued maintenance and management of the equipment and data mentioned in this proposal, beyond the life of the proposal itself. Using legislated funds existing as part of a "Support Implementation of the Coastal Resilience Plan" budget, VIMS will oversee equipment maintenance and steward related data in concert with the existence of said legislated funds.

2. Goals and Objectives:
    a. Goals should be listed as an outcome or result and solve the problem or need identified.
    b. Objectives must be specific, measurable and timebound.
    c. Objectives be achievable within the agreement period.

The goals and objectives of this project are as follows:

Goal 1: Structure and pilot the provision of parametric insurance coverage for residents of Mobjack Bay.

- Objective 1: Provide parametric insurance company with networked monitoring data (historic and new)
    - Target: One completed plan for gauge deployment.
- Objective 2: Launch new gauge network.
    - Target: Update existing monitoring equipment, including 3 CBNERR-VA stations.
    - Target: Deploy six new sensors in the Mobjack Bay and its associated tributaries.
- Objective 3: Establish parametric insurance coverage marketable to a new Mobjack Bay parametric insurance service area.
    - Target: Activation of parametric insurance policies in the Mobjack Bay service area
    - Target: Development of informational and educational materials and launch of campaign promoting new parametric insurance availability.
- Objective 4: Launch Low-Income Parametric Insurance Accelerator
    - Target: One campaign to solicit applications for free year of parametric insurance policies.
    - Target: Successfully develop, launch, and promote parametric policies for citizens. Number of new policies to be determined based on premium levels with funds being allocated on a first come first served basis.
- Objective 5: Conduct analyses of parametric policy premiums and identify strategies for

premium reductions.
    - Target: Survey each participant in the Low-Income Parametric Insurance Accelerator to understand premium costs, affordability, likelihood of renewal/sustainability of coverage, etc.
    - Target: Develop summary of findings to inform future parametric service area networks and modifications/improvements to the pilot service area as needed.
- Objective 6: Ensure transferability to other communities.
    - Target: One assessment of the success of pilot program toward the provision of services to communities beyond proposal's target geography.

Goal 2: Enhance and advance flood insurance policies and premium affordability, sea level monitoring, and flood forecasting in the Middle Peninsula.

- Objective 1: Develop, share and promote flood insurance educational materials
- Objective 2: Procure Flood Insurance Consultant to engage all registered FTF participants and advise as to how to structure new and restructure existing flood insurance policies. Solicit additional FTF participation and provide same services accordingly.
- Objective 3: Integrate new sensor data into the Tidewatch Network.
- Objective 4: Maintain and manage monitoring data through Tidewatch Network for continued insurance application, as well as flood forecasting and planning.

The MPPDC anticipates that these comprehensive enhancements will:

1. **Increase access to flood insurance coverage and payouts** through reduced premiums and parametric alternative.

2. **Mitigate loss of property and property value** in the face of adverse weather events, while capitalizing on the useful life of properties as much as is possible.

3. **Enhance quality of life for local residents** through increased monitoring data and related planning and forecasting.

3. Work Plan:

a. What are the major activities and tasks.
b. Who is responsible for completing the activities and tasks.
c. What is the timeframe for accomplishing activities and tasks.
d. Identify the required partners to ensure success and where they are represented in the workplan.
e. Deliverables
f. Maintenance plan tied to the identified viability of the project. Plan for sustaining the project after the agreement period (if applicable).

The anticipated work plan and schedule is as follows:

- **Year 1:**
    - Provision of historic data (VIMS to NPU)
    - NPU determines parametric insurance policy triggers, service area

    - NPU plans and begins implementing pilot provision in Mobjack Bay area
    - NPU and VIMS collaborate on location of additional tide gauges
        - VIMS communicates with municipalities and MPPDC where sensors will be installed to confirm that there are no issues that may prohibit installation at the chosen site; suggest alternative nearby site(s) if so
        - VIMS communicates with GreenStream (sensor developer) to confirm sensor purchase and delivery timeline
    - Tide gauges are installed on publicly owned infrastructure
        - Install water level sensors, and vertically calibrate via survey crew for converting distances to water surface to measured heights above NAVD88
        - Conduct sensitivity tests and collect data for tidal calibration
    - Data from new tide gauges is ingested into Tidewatch (VIMS)
        - Develop StormSense online platform to prepare for new sensors' inclusion into existing streaming database
    - VIMS will communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
    - Consociate Media will develop educational materials for the FTF website and other promotional avenues and promote new policy review and advisory services offered by new FTF Insurance Consultant
    - Hiring of new MPPDC FTF Program Administrator
    - MPPDC FTF Program Administrator will develop Low-Income Parametric Insurance Accelerator program guidelines
    - Procurement and contracting of FTF Insurance Consultant.
    - Insurance Consultant will engage and advise registered and new FTF participants
- **Year 2:**
    - Continued maintenance and management of sensors and their data
    - NPU refine parametric insurance policy triggers based on new data
    - Consociate Media to promote availability of new parametric insurance coverage availability
    - Consociate Media to promote availability of Low-Income Parametric Insurance Accelerator program and solicit participation
    - MPPDC FTF Program Administrator will process Low-Income Parametric Insurance Accelerator applications and coordinate with first responding and eligible property owners
    - NPU and FTF Insurance Consultant will develop policies for property owners receiving assistance through the Accelerator program
    - Insurance Consultant will continue to engage and advise registered and new FTF participants on flood insurance policies
    - VIMS will calibrate Tidewatch tidal prediction model and begin sharing storm tide forecasts via Tidewatch web portal and GreenStream Cloud
    - VIMS will continue to communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
- **Year 3:**
    - MPPDC FTF Program Administrator will continue to oversee the Low-Income Parametric Insurance Accelerator program
    - MPPDC FTF Program Administrator and FTF Insurance Consultant will conduct a survey of Accelerator Program participants to solicit and compile general information regarding their policies including but not limited to coverage amounts, items covered, and

premium amounts. The Insurance Consultant will use this information to better understand the affordability of premium costs and be able to coordinate with NPU regarding strategies for what can be done to ensure affordability for the greatest number of citizens as possible.
    - VIMS will coordinate with NPU to address any tweaks needed for continued provision of services
    - VIMS will provide continued maintenance and management of sensors and their data
    - Insurance Consultant will continue to engage and advise registered and new FTF participants on flood insurance policies
    - VIMS will continue to communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
- **Beyond grant:**
    - Transfer pilot program based on experience in Mobjack Bay
    - VIMS will perform continued maintenance and management of sensors and their data

Additional details and detailed scope of sensor updates, installation and data provision outlined by VIMS is provided as below.

1. Overview of VIMS and Work on Sea Level Rise: *Building flood resilience in coastal communities requires a precise understanding of the temporal and spatial scales of inundation and the ability to detect and predict changes in flooding.*
The Virginia Institute of Marine Science (VIMS) is the graduate school in marine science for the College of William & Mary. VIMS has a three-part mission to conduct research in coastal ocean and estuarine science, educate students and citizens, and provide advisory service to policy makers, industry, and the public. VIMS provides these services to Virginia, the nation, and the world. Chartered in 1940, VIMS is currently among the largest marine research and education centers in the United States. In service to VIMS's three-part mission, the institution has shared its long-standing record of flood prediction expertise through its Estuarine Coastal Modeling Research Group, flood-related advisory services via the Center for Coastal Resources Management, and most recently, the VA state legislature has recognized VIMS as a founding member of the new VA Commonwealth Center for Recurrent Flooding Resiliency (CCRFR), established in 2016.[1] The CCRFR is a state-funded virtual research center established between VIMS, Old Dominion University, and the Virginia Coastal Policy Center at the William and Mary Law School, and serves as a source of scientific, socio-economic, legal, and policy analyses aimed at building Virginia's resiliency against flooding.[2]

In 2021, the Virginia Coastal Resilience Master Plan, Phase 1 Report encouraged the expansion of an integrated network of ocean, earth, and atmospheric data collection from both private and public sector organizations that are engaged in active scientific monitoring and observing.[1] The existing sensor network has grown to include monitoring of water levels, land subsidence, wave measurements, current measurements, and atmospheric conditions. These products have been incorporated into data portals and integrated services for public access and to help support resilience planning for municipalities, and commercial businesses. This proposal reviews 21 potential sites for the installation of 6 new water level sensors in Mobjack Bay, VA. The sensor scope of work presents estimated purchasing costs for the installation of 6 new water level sensors near: 1) State-Owned, Locally-Owned, or Jointly-Owned Working Waterfront sites in Gloucester and Mathews County within the Middle Peninsula Planning District Commission (MPPDC), and 2) bridges over tidal waterways adjacent to frequently inundated lands.

2. Description of Sensor Network and Tidewatch: *Here, information on the present regional sensor*

network is described, along with VIMS' efforts to collect, analyze, and communicate data about sea level rise and forecasts through Tidewatch.

There are currently 65 publicly-streaming water level monitoring stations throughout southeastern Virginia (Fig. 1). Many of these were recently installed by the USGS, who has installed 19 Ka-band radar sensors in coastal Virginia in 2015 and 2016, and StormSense, which is a smart cities project led by Dr. Derek Loftis at VIMS, which has installed 31 water level sensors in 2018 (28 ultrasonic sonar, and 3 Ka-band radar sensors).[2] Among federal entities, NOAA has 6 (marked in blue) and USGS maintains 19 (noted in green), while among local entities, VIMS has 1, and StormSense has 31 (all marked in red).[3] VIMS operates and maintains a water level monitoring and tidal prediction service called Tidewatch, which now operates under the CCRFR.[2]

Tidewatch ingests web service data streams from NOAA, USGS, and StormSense, but VIMS maintains two gauges of its own in Back River near Langley AFB, and Tangier Island in central Chesapeake Bay.[3] Tidewatch is an operational tidal forecast product that forms its 36-hr forward-looking predictions by extracting tidal harmonic constituents for amplitude, phase, and frequency from observations collected by a water level sensor and can begin making tidal forecasts after a minimum of a 90-day continuous data record after installation and vertical calibration is complete. Tidewatch forecasts update every 30 minutes, and it is set apart from other tidal prediction algorithms by its automated assessment of monitoring observation anomalies in the form of an applied monthly moving average (m30). The residual m30 signal is a unique form of data assimilation used to enhance Tidewatch's tidal predictive accuracy.[2] Predictions from Tidewatch are available on the CCRFR website, the VIMS website, and the VIMS Center for Coastal Resources Management's AdaptVA portal.

It is the intention that the 6 new sensors proposed herein will employ Tidewatch as a starting point to integrate sensors throughout the Mobjack Bay region (Fig. 2). There are 2 NOAA NWLON tide gauges near Mobjack Bay: to the north near the mouth of the Rappahannock River at Windmill Point (Windmill Point, VA - Station 8636580), and to the south near the mouth of the York River at Yorktown USCG Training Center near Gloucester Point (Gloucester Point - Station 8637689). There is also a relatively new USGS tide gauge installed in 2019 at the Ware River Yacht Club in Mobjack Bay near Naxera (Ware River - Station 01670060). These three federally-maintained water level sensors are highly-accurate water level monitoring sensors with sufficient elevation benchmarking surveys to serve as primary data sources for parametric insurance models, which are used to derive flood risk for infrastructural assets in and around coastal floodplains. The goal of installing 6 new sensors in Mobjack Bay is to provide secondary sensor sites with high accuracy water level standards and accurate elevation benchmarking to sufficiently supplement the primary NOAA and USGS sensor sites to supply a parametric insurance model with additional data in each of the tidal tributaries leading to Mobjack Bay to help improve risk estimation for the rural localities near the proposed sensors. Of the 21 proposed sensor sites depicted in red in Fig. 2, there are: 13 near Public Working Waterfront sites (7 Locally-Owned, 1 State-Owned, and 6 Jointly-Owned), and 7 near VDOT-maintained bridges over tidal headwaters of tributaries feeding Mobjack Bay.

In addition to these new sensors, existing sensors, managed by the Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERR-VA) will contribute to historic and ongoing tidal monitoring. Specifically, CBNERR-VA maintains water level gauges at three of its reserve sites on the York River. Two of its stations have real-time data telemetry capabilities; all have data archives supported by CBNERR-VA and VIMS; none are yet integrated real-time into the Tidewatch Network. Archived data from these sites will contribute to the historic record informing insurance provision. Meanwhile, ongoing monitoring at these stations will provide complementary data for a holistic picture of Mobjack Bay water levels and flooding. In an effort to ensure that these sensors are equipped for continued and accurate data

provision, and to integrate data from these stations into the Tidewatch Network, funds are sought in support of CBNERR-VA equipment telemetry and related staff time.

3. Description of How Additional Sensors Will Contribute to Understanding Impacts of Sea Level Rise, and Explanation of Sensor Suitability Model for Mobjack Bay: *VIMS' long-standing research expertise in the region will be leveraged along with the new proposed sensors to better understand localized influences on eustatic sea level change from the Gulf Stream off the shore of Virginia's coast, while identifying the effects on observed sea level change attributed to land subsidence.*

The local communities will benefit from more neighborhood-specific flood forecasts and from appropriating a targeted early warning system to notify stakeholders of potentially hazardous flood conditions predicted and observed at proximal sensors, upon integration into the StormSense network. Additional synergistic emergency management benefits include feedback credits for progressive communities enrolled in FEMA's National Flood Insurance Program, in the interest of providing discounted costs for flood insurance to all. Both the short- and long-term impacts of sea level rise and flooding may be effectively researched and better understood to aid in flood resilience and new partnerships are being established that enable the interconnection of smart communities and technology innovation across agency missions. In a relatively recent presentation to the Hampton Roads Planning District Commission's Regional Resilience Working Group, a regionally resolute simulated gaps analysis review of 85 new suitable bridge-mounted water level sensor locations throughout southeastern Virginia was presented.[4] Suitability was determined by Lidar-detected deck heights for all bridges over open tidally-connected waterways. The sites were identified using SCHISM hydrodynamic modeling simulations compared with the existing network of water level sensor observations, and then a list was exported favoring sites that were <85% match in predictions, when compared with the next nearest suggested location during heavy wind conditions, and <95% match during regular tidal conditions. Of the 85 sites reviewed, 7 new suggested sensor installation sites near Mobjack Bay were identified as potential locations with bridges of sufficient elevation with consideration of projected sea level trends.[4] A map of those suggested sites are presented in Fig. 2, and a small number of these sites have since had sensors installed nearby by StormSense or the USGS, and StormSense's data portal updates every 6 minutes with new real-time water elevation measurements, and it contains cloud archiving of all past recorded water level observations.[3,6,7,8]

4. Description of Coordination with Local Governments on Sensor Installation and Maintenance:

Dr. Loftis regularly participates and presents StormSense's progress on sensor installations in local flood adaptation forums and to localities, Regional Planning District Commissions, and the Commonwealth of Virginia.

StormSense currently holds data management and maintenance calls with GreenStream and participating localities monthly to address to discuss data integration, planned sensor installations, and any support needs for currently-installed water-level sensors. In the first three quarters of this project, Dr. Loftis will communicate with the localities/entities involved, including Gloucester County, Mathews County and Middle Peninsula Planning District Commission, to help determine sensor placement sites and feasibility at those sites ultimately chosen. Moreover, the Middle Peninsula PDC's communication with county administrators during these three first project quarters will include education on the benefits of parametric insurance and exploration of local benefits toward potential future cost sharing.

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4. Evaluation

a. Indicators of success.

The indicators of success are indicated by the target metrics provided for each objective in the previous sections.

b. Data that will be collected and how the data will be used to measure success.

This information is provided in previous sections. All data generated through the proposed activities is instrumental to achieving the goals and objectives of the project.

c. How was cost effectiveness evaluated and measured against the expected outcomes?

This is thoroughly explained in previous sections. The cost of not carrying out the proposed activities is failure to achieve community wide improvements towards coastal resilience.

d. What products, services, meetings, outreach efforts etc. will be conducted and how will success be measured?

This information is provided in previous sections. Success will be made by reaching the target metrics previously provided.

e. Project progress monitoring plan to ensure project meets the requirements of the agreement and is delivered on time. Outline how delays or other findings may be used to modify or improve outcomes/deliverables.

Progress will be monitored monthly by comparing the actual progress to the anticipated progress in the original project schedule. Progress will be reported quarterly to DCR along with a reimbursement invoice in compliance with the terms of the grant contract. Explanations for discrepancies in anticipated and actual progress will be provided along with corrective action steps and/or a request to revise the project schedule. Project delays may result in a request to extend the deadline. Other findings that may impact outcomes, deliverables, and the schedule will be described. We understand that activities must commence within 12 months of the agreement date and must be completed within 36 months. The final reimbursement request will be submitted to DCR within 90 days of the project completion date in compliance with the grant contract.

f. If applicable, how the study may improve Virginia's flood protection and prevention abilities in a statewide context.

NA; the project contains analytical elements but is centered around construction and deployment of a new network of gauges/sensors.

g. Other necessary information to establish project priority

As stated previously, the project has been identified as a top priority for the MPPDC and through various state plans related to flood protection and coastal resilience.

h. Repetitive Loss and/or Severe Repetitive Loss Properties

The red dots on the map below identify the location of repetitive loss and/or severe repetitive loss properties within the project area. As a total there are 146 properties in Gloucester County that are repetitive and/or severe repetitive loss properties and there are 169 properties in Mathews County that are classified as repetitive and/or severe repetitive loss properties.

. Residential and/or Commercial Structures – Describe the residential and commercial structures impacted by this project, including how they contribute to the community such as historic, economic, or social value. Provide an exact number of residential structures and commercial structures in the project area.

Residential and commercial structures within the project area will be candidates to participate in the second part of this project where flood insurance policies will be reviewed, and strategies will be developed to make flood insurance more affordable for local property owners.

Within Gloucester County residential land comprises the largest developed landuse within the County, with the highest residential concentrations located in the Court House and Gloucester Point/Hayes areas. As public water and sewer are available throughout much of the Route 17 corridor between Gloucester Point and the Court House, areas inside the Development District are identified for higher density commercial and residential development. Gloucester Point/Hayes and the Court House are identified as Village Development Areas (VDA's), areas designated for higher density development due to proximity to transportation facilities, public water and sewer availability, and/ or a developed area to be used for redevelopment or infill development. Outside of the VDA's, residential development has primarily occurred along major roadways with scattered residential lots and subdivisions dispersed throughout other rural areas.

Within Mathews County According to the 2010 Census, most of the residential structures in the County were single-family homes (85%). Apartments or duplex

structures represented less than 3% of the housing stock, while mobile homes represented approximately 12.5% of the housing stock.

It's important to mention that the majority of structures located within the project area are residential. Since many of these structures are waterfront, they contribute substantially to the tax base of each County. Additionally, based on outcomes from the 2021 Regional All Hazards Mitigation Plan Gloucester County and Mathews County has the highest potential annualized loss due to sea level rise and hurricanes. Therefore, as this project area highly vulnerable to inundation these residents need assistance.

i. Critical Facilities/Infrastructure – If there are critical facilities/infrastructure within the project area, describe each facility.

According to the Middle Peninsula Regional All Hazards Mitigation Plan, there are critical Facilities/infrastructure within Gloucester and Mathews County. Below provides details about each county.

GLOUCESTER COUNTY - The county has a relatively extensive network of public water and sewer facilities in and around the Gloucester Courthouse area. The Beaverdam Reservoir, located just north of the courthouse area, serves as the drinking water source for the county's public water supply system. As discussed earlier in the Dam Impoundment Section of the plan, the dam is structurally well-built and remains fully certified by the DCR (Figure 3). Below the dam there are approximately 200 homes that would flood if the Reservoir structure failed. However, in 1999 the impoundment overflowed during Hurricane Floyd yet no flood damage to the home since the excess water flowed downstream using the emergency spillway.

The table below provides a list of dams from the Virginia Department of Conservation and Recreation's Certification List within Gloucester County that may be impacted by natural hazards as well.

The water distribution system does not suffer damage during severe storm events since it is a closed underground system. The sewerage collection lines and pumps stations are owned and operated by Gloucester County. There are 2 pump stations in the Gloucester Courthouse area (Pump # 11 and Pump #13) that sustained damage during Hurricane Floyd in 1999. The damage was caused by floodwaters resulting from the overtopping of the Beaverdam Reservoir as previously mentioned. After the wastewater is collected, it is transported in a large force main that runs down Route 17, crosses under the York River and then flows into the York River Wastewater Treatment Plant in York County. The large force main and treatment plant are owned and operated by the Hampton Roads Sanitation District. The force main is a closed underground system that does not sustain damage during severe flooding events.

The Achilles Elementary School site, located in the southeastern section of the county, is adversely affected by flood waters from storms surges associated with a Category 1 hurricane.

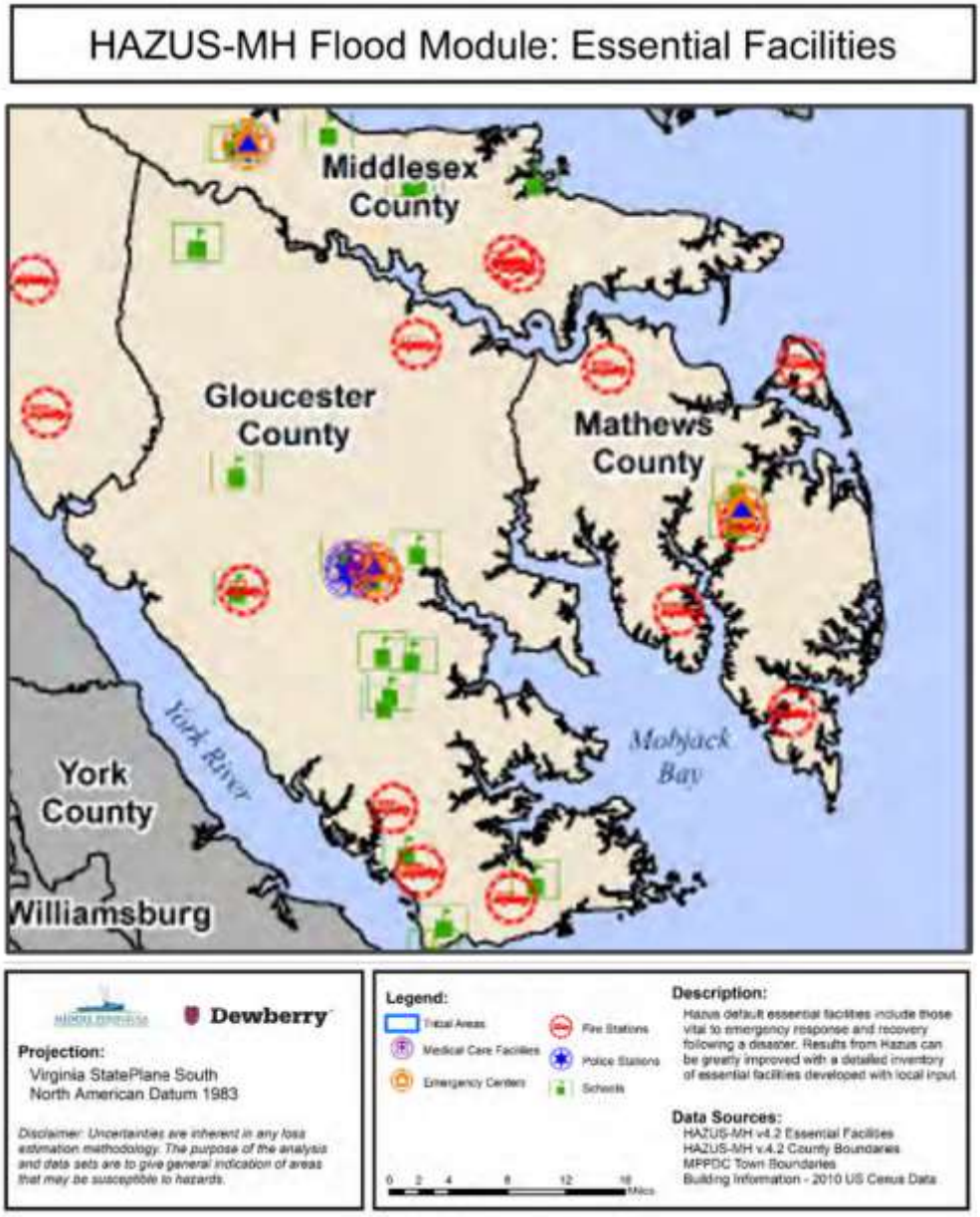
MATHEWS COUNTY - New Point Comfort Lighthouse, located at the southern tip of Mathews County, has undergone significant flood damage resulting from the lighthouse being separated from the mainland due to severe erosion.

Mathews County owns the lighthouse facility. In 2016 the Waterfront Development Corporation installed a new pier at the lighthouse that allowed contractors to access the site for restoring the stone tower.

Restoration of the tower started in 2020 and concluded on October 12, 2021, when a ceremony was held to relight the lighthouse.

Figure 5 is a map of the critical facilities within Gloucester and Mathews Counties.

Figure 5: Essential facilities map of Gloucester and Mathews Counties.



Therefore, through this project the parts of the counties will be able to access parametric and flood insurance for their structures and properties. Ultimately creating a more resilient community.

Benefit-cost analysis

Not applicable as the request is below the $2,000,000 threshold.

No adverse impact

The proposed activities will have no adverse impacts on flooding and strives to minimize flood resilience.

Approach, Milestones, and Deliverables

The anticipated work plan and schedule is as follows:

- **Year 1:**
    - Provision of historic data (VIMS to NPU)
    - NPU determines parametric insurance policy triggers, service area
    - NPU plans and begins implementing pilot provision in Mobjack Bay area
    - NPU and VIMS collaborate on location of additional tide gauges
        - VIMS communicates with municipalities and MPPDC where sensors will be installed to confirm that there are no issues that may prohibit installation at the chosen site; suggest alternative nearby site(s) if so
        - VIMS communicates with GreenStream (sensor developer) to confirm sensor purchase and delivery timeline
    - Tide gauges are installed on publicly owned infrastructure
        - Install water level sensors, and vertically calibrate via survey crew for converting distances to water surface to measured heights above NAVD88
        - Conduct sensitivity tests and collect data for tidal calibration
    - Data from new tide gauges is ingested into Tidewatch (VIMS)
        - Develop StormSense online platform to prepare for new sensors' inclusion into existing streaming database
    - VIMS will communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
    - Consociate Media will develop educational materials for the FTF website and other promotional avenues and promote new policy review and advisory services offered by new FTF Insurance Consultant
    - Hiring of new MPPDC FTF Program Administrator
    - MPPDC FTF Program Administrator will develop Low-Income Parametric Insurance Accelerator program guidelines
    - Procurement and contracting of FTF Insurance Consultant.
    - Insurance Consultant will engage and advise registered and new FTF participants
- **Year 2:**
    - Continued maintenance and management of sensors and their data
    - NPU refine parametric insurance policy triggers based on new data
    - Consociate Media to promote availability of new parametric insurance coverage availability
    - Consociate Media to promote availability of Low-Income Parametric Insurance Accelerator program and solicit participation
    - MPPDC FTF Program Administrator will process Low-Income Parametric Insurance Accelerator applications and coordinate with first responding and eligible property owners
    - NPU and FTF Insurance Consultant will develop policies for property owners receiving assistance through the Accelerator program
    - Insurance Consultant will continue to engage and advise registered and new FTF participants on flood insurance policies
    - VIMS will calibrate Tidewatch tidal prediction model and begin sharing storm tide forecasts via Tidewatch web portal and GreenStream Cloud

    - VIMS will continue to communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
- **Year 3:**
    - MPPDC FTF Program Administrator will continue to oversee the Low-Income Parametric Insurance Accelerator program
    - MPPDC FTF Program Administrator and FTF Insurance Consultant will conduct a survey of Accelerator Program participants to solicit and compile general information regarding their policies including but not limited to coverage amounts, items covered, and premium amounts. The Insurance Consultant will use this information to better understand the affordability of premium costs and be able to coordinate with NPU regarding strategies for what can be done to ensure affordability for the greatest number of citizens as possible.
    - VIMS will coordinate with NPU to address any tweaks needed for continued provision of services
    - VIMS will provide continued maintenance and management of sensors and their data
    - Insurance Consultant will continue to engage and advise registered and new FTF participants on flood insurance policies
    - VIMS will continue to communicate with localities regarding new sensor installations, and publicize work at local and regional flood adaptation forums
- **Beyond grant:**
    - Transfer pilot program based on experience in Mobjack Bay
    - VIMS will perform continued maintenance and management of sensors and their data

Additional details and detailed scope of sensor updates, installation and data provision outlined by VIMS is provided as below.

1. Overview of VIMS and Work on Sea Level Rise: *Building flood resilience in coastal communities requires a precise understanding of the temporal and spatial scales of inundation and the ability to detect and predict changes in flooding.*

The Virginia Institute of Marine Science (VIMS) is the graduate school in marine science for the College of William & Mary. VIMS has a three-part mission to conduct research in coastal ocean and estuarine science, educate students and citizens, and provide advisory service to policy makers, industry, and the public. VIMS provides these services to Virginia, the nation, and the world. Chartered in 1940, VIMS is currently among the largest marine research and education centers in the United States. In service to VIMS's three-part mission, the institution has shared its long-standing record of flood prediction expertise through its Estuarine Coastal Modeling Research Group, flood-related advisory services via the Center for Coastal Resources Management, and most recently, the VA state legislature has recognized VIMS as a founding member of the new VA Commonwealth Center for Recurrent Flooding Resiliency (CCRFR), established in 2016.[1] The CCRFR is a state-funded virtual research center established between VIMS, Old Dominion University, and the Virginia Coastal Policy Center at the William and Mary Law School, and serves as a source of scientific, socio-economic, legal, and policy analyses aimed at building Virginia's resiliency against flooding.[2]

In 2021, the Virginia Coastal Resilience Master Plan, Phase 1 Report encouraged the expansion of an integrated network of ocean, earth, and atmospheric data collection from both private and public sector organizations that are engaged in active scientific monitoring and observing.[1] The existing sensor network has grown to include monitoring of water levels, land subsidence, wave measurements, current measurements, and atmospheric conditions. These products have been incorporated into data portals

and integrated services for public access and to help support resilience planning for municipalities, and commercial businesses. This proposal reviews 21 potential sites for the installation of 6 new water level sensors in Mobjack Bay, VA. The sensor scope of work presents estimated purchasing costs for the installation of 6 new water level sensors near: 1) State-Owned, Locally-Owned, or Jointly-Owned Working Waterfront sites in Gloucester and Mathews County within the Middle Peninsula Planning District Commission (MPPDC), and 2) bridges over tidal waterways adjacent to frequently inundated lands.

2. Description of Sensor Network and Tidewatch: *Here, information on the present regional sensor network is described, along with VIMS' efforts to collect, analyze, and communicate data about sea level rise and forecasts through Tidewatch.*

There are currently 65 publicly-streaming water level monitoring stations throughout southeastern Virginia (Fig. 1). Many of these were recently installed by the USGS, who has installed 19 Ka-band radar sensors in coastal Virginia in 2015 and 2016, and StormSense, which is a smart cities project led by Dr. Derek Loftis at VIMS, which has installed 31 water level sensors in 2018 (28 ultrasonic sonar, and 3 Ka-band radar sensors).[2] Among federal entities, NOAA has 6 (marked in blue) and USGS maintains 19 (noted in green), while among local entities, VIMS has 1, and StormSense has 31 (all marked in red).[3] VIMS operates and maintains a water level monitoring and tidal prediction service called Tidewatch, which now operates under the CCRFR.[2]

Tidewatch ingests web service data streams from NOAA, USGS, and StormSense, but VIMS maintains two gauges of its own in Back River near Langley AFB, and Tangier Island in central Chesapeake Bay.[3] Tidewatch is an operational tidal forecast product that forms its 36-hr forward-looking predictions by extracting tidal harmonic constituents for amplitude, phase, and frequency from observations collected by a water level sensor and can begin making tidal forecasts after a minimum of a 90-day continuous data record after installation and vertical calibration is complete. Tidewatch forecasts update every 30 minutes, and it is set apart from other tidal prediction algorithms by its automated assessment of monitoring observation anomalies in the form of an applied monthly moving average (m30). The residual m30 signal is a unique form of data assimilation used to enhance Tidewatch's tidal predictive accuracy.[2] Predictions from Tidewatch are available on the CCRFR website, the VIMS website, and the VIMS Center for Coastal Resources Management's AdaptVA portal.

It is the intention that the 6 new sensors proposed herein will employ Tidewatch as a starting point to integrate sensors throughout the Mobjack Bay region (Fig. 2). There are 2 NOAA NWLON tide gauges near Mobjack Bay: to the north near the mouth of the Rappahannock River at Windmill Point (Windmill Point, VA - Station 8636580), and to the south near the mouth of the York River at Yorktown USCG Training Center near Gloucester Point (Gloucester Point - Station 8637689). There is also a relatively new USGS tide gauge installed in 2019 at the Ware River Yacht Club in Mobjack Bay near Naxera (Ware River - Station 01670060). These three federally-maintained water level sensors are highly-accurate water level monitoring sensors with sufficient elevation benchmarking surveys to serve as primary data sources for parametric insurance models, which are used to derive flood risk for infrastructural assets in and around coastal floodplains. The goal of installing 6 new sensors in Mobjack Bay is to provide secondary sensor sites with high accuracy water level standards and accurate elevation benchmarking to sufficiently supplement the primary NOAA and USGS sensor sites to supply a parametric insurance model with additional data in each of the tidal tributaries leading to Mobjack Bay to help improve risk estimation for the rural localities near the proposed sensors. Of the 21 proposed sensor sites depicted in red in Fig. 2, there are: 13 near Public Working Waterfront sites (7 Locally-Owned, 1 State-Owned, and 6 Jointly-Owned), and 7 near VDOT-maintained bridges over tidal headwaters of tributaries feeding Mobjack Bay.

In addition to these new sensors, existing sensors, managed by the Chesapeake Bay National Estuarine Research Reserve in Virginia (CBNERR-VA) will contribute to historic and ongoing tidal monitoring. Specifically, CBNERR-VA maintains water level gauges at three of its reserve sites on the York River. Two of its stations have real-time data telemetry capabilities; all have data archives supported by CBNERR-VA and VIMS; none are yet integrated real-time into the Tidewatch Network. Archived data from these sites will contribute to the historic record informing insurance provision. Meanwhile, ongoing monitoring at these stations will provide complementary data for a holistic picture of Mobjack Bay water levels and flooding. In an effort to ensure that these sensors are equipped for continued and accurate data provision, and to integrate data from these stations into the Tidewatch Network, funds are sought in support of CBNERR-VA equipment telemetry and related staff time.

3. Description of How Additional Sensors Will Contribute to Understanding Impacts of Sea Level Rise, and Explanation of Sensor Suitability Model for Mobjack Bay: *VIMS' long-standing research expertise in the region will be leveraged along with the new proposed sensors to better understand localized influences on eustatic sea level change from the Gulf Stream off the shore of Virginia's coast, while identifying the effects on observed sea level change attributed to land subsidence.*

The local communities will benefit from more neighborhood-specific flood forecasts and from appropriating a targeted early warning system to notify stakeholders of potentially hazardous flood conditions predicted and observed at proximal sensors, upon integration into the StormSense network. Additional synergistic emergency management benefits include feedback credits for progressive communities enrolled in FEMA's National Flood Insurance Program, in the interest of providing discounted costs for flood insurance to all. Both the short- and long-term impacts of sea level rise and flooding may be effectively researched and better understood to aid in flood resilience and new partnerships are being established that enable the interconnection of smart communities and technology innovation across agency missions. In a relatively recent presentation to the Hampton Roads Planning District Commission's Regional Resilience Working Group, a regionally resolute simulated gaps analysis review of 85 new suitable bridge-mounted water level sensor locations throughout southeastern Virginia was presented.[4] Suitability was determined by Lidar-detected deck heights for all bridges over open tidally-connected waterways. The sites were identified using SCHISM hydrodynamic modeling simulations compared with the existing network of water level sensor observations, and then a list was exported favoring sites that were <85% match in predictions, when compared with the next nearest suggested location during heavy wind conditions, and <95% match during regular tidal conditions. Of the 85 sites reviewed, 7 new suggested sensor installation sites near Mobjack Bay were identified as potential locations with bridges of sufficient elevation with consideration of projected sea level trends.[4] A map of those suggested sites are presented in Fig. 2, and a small number of these sites have since had sensors installed nearby by StormSense or the USGS, and StormSense's data portal updates every 6 minutes with new real-time water elevation measurements, and it contains cloud archiving of all past recorded water level observations.[3,6,7,8]

4. Description of Coordination with Local Governments on Sensor Installation and Maintenance:

Dr. Loftis regularly participates and presents StormSense's progress on sensor installations in local flood adaptation forums and to localities, Regional Planning District Commissions, and the Commonwealth of Virginia.

StormSense currently holds data management and maintenance calls with GreenStream and participating localities monthly to address to discuss data integration, planned sensor installations, and any support needs for currently-installed water-level sensors. In the first three quarters of this project, Dr. Loftis will communicate with the localities/entities involved, including Gloucester County, Mathews County and Middle Peninsula Planning District Commission, to help determine sensor placement sites and feasibility at those sites ultimately chosen. Moreover, the Middle Peninsula PDC's communication with county

administrators during these three first project quarters will include education on the benefits of parametric insurance and exploration of local benefits toward potential future cost sharing.

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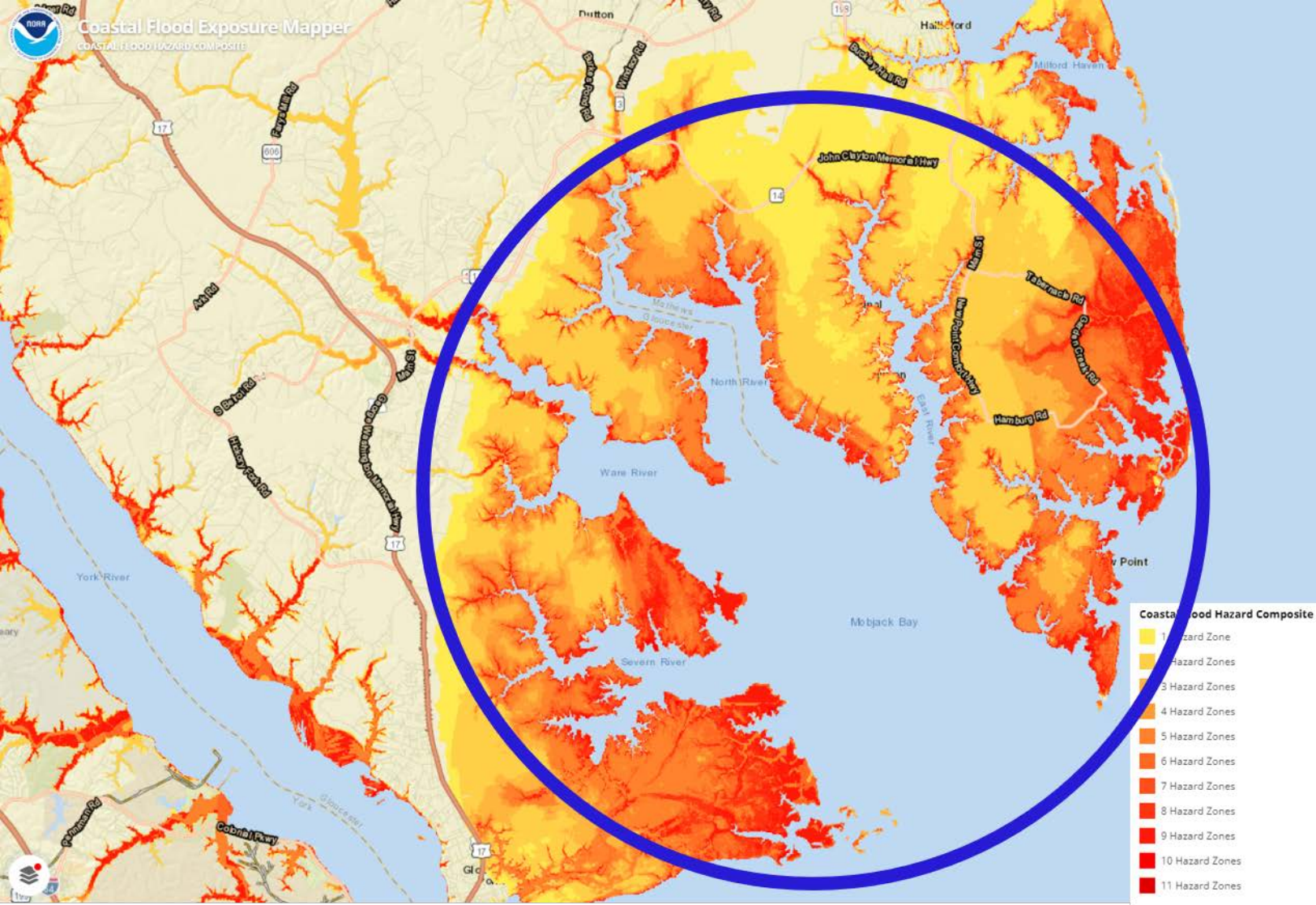
https://wm1693.box.com/s/g9saevxxuwlzn4g7kdmnpici75k4i2db.

Ability to Provide Share of Cost

$1,000,000 of DCR grant funds are being requested and a match waiver is being requested for this project serving low-income areas. MPPDC is offering an additional $150,000 of value in MPPDC living shoreline loan funds utilized for constructing living shorelines in the Mobjack Bay as leveraged match against this total request. The total estimated project cost is $1,150,000. The MPPDC match commitment and authorization letter has been uploaded to the grants portal.


Coastal Flood Exposure Mapper
COASTAL FLOOD HAZARD COMPOSITE
Dutton
Hallieford
Milford Haven
Buckley Hall Rd
John Clayton Memorial Hwy
Tabernacle Rd
Robins Creek Rd
New Point Comfort Hwy
Hamburg Rd
Ark Rd
S Bethel Rd
Hickory Fork Rd
George Washington Memorial Hwy
Mathews
Gloucester
North River
East River
Ware River
York River
Mobjack Bay
Severn River
Point
Cobbs Ferry
Coastal Flood Hazard Composite
1 Hazard Zone
2 Hazard Zones
3 Hazard Zones
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MAINTENANCE, MANAGEMENT, AND MONITORING PLAN

The MPPDC and project partners propose the following activities as required by the DCR CFPF Round 4 Manual, which will ensure that the public investment of DCR CFPF funds is protected.

MPPDC staff will utilize the below maintenance agreement template, which includes explanation of the responsibilities for monitoring, replacement (as necessary), and reporting of the project following construction. Each property owner will sign this document and MPPDC staff will submit the signed document to DCR prior to any construction occurring. MPPDC staff is willing to work with DCR to modify the agreement and related maintenance, management, and monitoring activities should DCR wish to see these matters handled differently.

DCR Provided
CERTIFICATION OF PROPERTY OWNER
Property Protection Project

Grant No. [Insert Number]
Name: [Name of Property Owner/Entity]
County, State Zip: [Address of Property]
Phone: [Insert Phone Number]
Email: [Insert Email]

The undersigned certifies to the Middle Peninsula Planning Commission District (PDC), that

1. I am/we are the owner/co-owner of [Insert address of Property where project is taking place].
2. I am/we are the recipient of Grant [Insert Grant Number] for the purpose of deploying a nature-based solution on my real property or at [Insert Address] for the purposes of flood prevention or mitigation.
3. I/we received [Insert Award Amount] (DCR Funds) to fund, in whole or in part, the stormwater protection activities including construction of a stormwater collection system on the Historic Antioch Rosenwald School Building.
4. I/we understand that it is my/our obligation to maintain the stormwater collection system for a minimum of 10 years.
5. I/we have the necessary resources to maintain the stormwater collection system for a minimum of ten (10) years.
6. That I agree to annually inspect and certify to both the PDC and the Virginia Department of Conservation and Recreation that the project is maintained in good order for no fewer than ten (10) years.
7. That I agree to permit the PDC or the Virginia Department of Conservation and Recreation to inspect the project to ensure that it is being maintained in good order for a period of ten (10) years after its completion. Inspections may occur at the discretion of the PDC or the Virginia Department of Conservation and Recreation; however, reasonable notice shall be given prior to the inspection, and no project shall be inspected more than once in a calendar year, provided that inspection does not result in needed repairs.
8. That I agree that I will repay the full amount listed in Item 3 if the project is not maintained in good repair for a minimum of ten (10) years.

_____	_____
Signature of Property Owner	Signature of Property Owner
_____	_____
Printed Name	Printed Name
_____	_____
Date	Date

Repetitive Loss and/or Sever Repetitive Loss Properties

The red dots on the map below identify the location of repetitive loss and/or severe repetitive loss properties within the project area. As a total there are 146 properties in Gloucester County that are repetitive and/or severe repetitive loss properties and there are 169 properties in Mathews County that are classified as repetitive and/or severe repetitive loss properties.